

NOVEMBER

THIS ISSUE 119,000

10 CENTS

POPULAR MECHANICS

WRITTEN SO YOU CAN UNDERSTAND IT

PUBLISHED IN CHICAGO

LARGEST CIRCULATION OF ANY MECHANICAL PUBLICATION IN THE WORLD

Military Airship Now a Real Terror

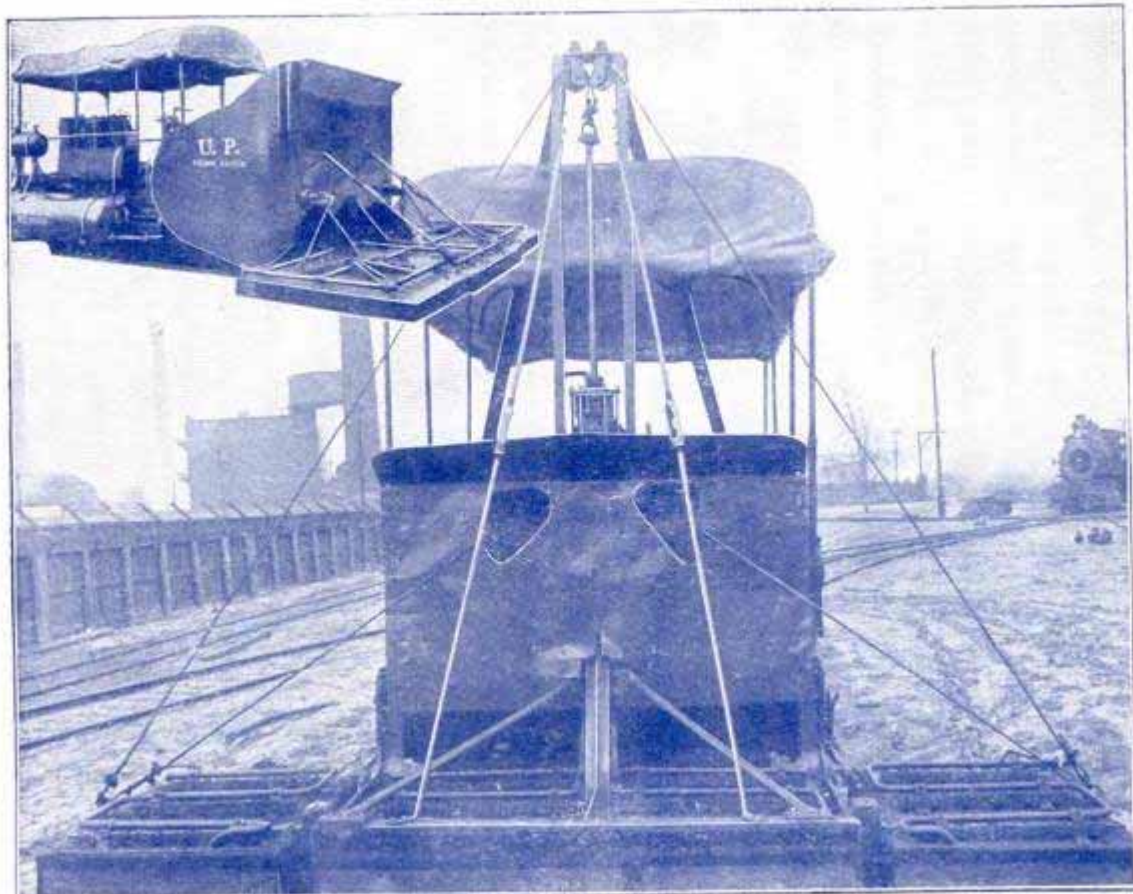
Sails Against Wind with Ton of Deadly Explosives

141 Articles and 130 Illustrations

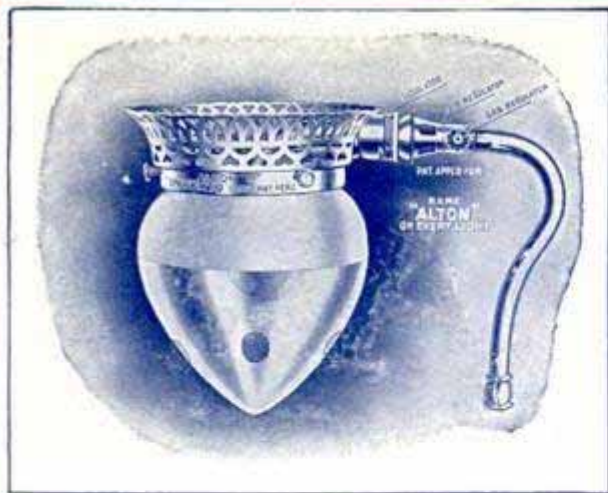
In this Issue—See Table of Contents, Page 1179

Greatest Weed Killer in the World

Does the Work of More than 300 Men



READY NOVEMBER 15—"SHOP NOTES FOR 1908"—PRICE, 50 CENTS—ASK YOUR NEWSDEALER



THIS IS THE NEW Alton "Inverto" GAS LIGHT

A Shadowless, Pure White Light
All the light is thrown downward

The Alton "Inverto" gives six times the light and cuts your gas bill in half. The best Inverted Gas Light human ingenuity can devise. Handsome in appearance, durable in construction, economical in use. The Alton "Inverto" is adjustable to any Gas Fixture.

Send \$1.50 for a Complete Sample. Express Prepaid

AGENTS WANTED in every city or town where gas is used.

ALTON MANUFACTURING COMPANY

1163 St. James Bldg., NEW YORK CITY

Brannt. Practical Dry Cleaner, Scourer and Garment Dyer

BEST AND MOST UP-TO-DATE BOOK ON THESE
SUBJECTS IN ANY LANGUAGE

JUST READY

The Practical Dry Cleaner, Scourer and Garment Dyer: comprising Dry or Chemical Cleaning; Purification of Benzine; Removing Stains; Wet Cleaning; Finishing Cleaned Fabrics; Cleaning and Dyeing Furs, Skin Rugs and Mats; Cleaning and Dyeing Feathers; Bleaching and Dyeing Straw Hats; Cleaning and Dyeing Gloves; Garment Dyeing; Stripping; Analysis of Textile Fabrics. Edited by William T. Brannt. Second edition, in great part re-written and much enlarged. 21 engravings, 293 pages.

Price.....\$2.50 Net.

By mail, free of postage, at the publication price, to any address in the world

An elaborate circular of three pages, quarto, showing the full table of contents, with specimens of the illustrations will be sent to anyone in any part of the world furnishing his address.

HENRY CAREY BAIRD & Co.

Industrial Publishers, Booksellers and Importers

810 Walnut Street, Philadelphia, Pa., U. S. A.

The NEW FUEL

How to Make It.

The NEW INDUSTRY

For Everybody.

The NEW EDITION

OF

WRIGHT'S

MANUFACTURE of ALCOHOL

Second edition, revised and greatly enlarged, with New Law, Government Regulations, Authorized U. S. Formulas, Latest American Practice and Apparatus fully explained.

283 pages, 60 illustrations, and folding plates, 12mo, cloth. **\$1.00**

Mailed postpaid on receipt of price

SPON & CHAMBERLAIN

123 P. M. LIBERTY ST., NEW YORK



These Buildings and Over 8000 Others are Supplied by The Kewanee System of Water Supply

HAVE you a water supply problem to solve? The Kewanee System will solve it satisfactorily and economically. We guarantee successful operation, or your plant may be returned at our expense of freight charges and your money will be refunded.

All the conveniences and protection of the best city water works are afforded, without the inconveniences, expense and annoyance which go hand in hand with inferior systems. Our guarantee and the successful operation of over 8000 Kewanee Systems are your assurance of entire satisfaction.



The Kewanee System of Water Supply

is being used for an almost endless variety of requirements,—for city, suburban and country residences, farms, schools, hotels, public institutions, apartment buildings, neighborhood water works, and small towns.

The technical and practical knowledge of our hydraulic engineers and our intimate knowledge of this subject gained from over ten years' experience, are at your service.

In the Kewanee System, there is no elevated tank to mar the landscape view, to leak, freeze, or collapse; and no dangerous and inefficient attic tank is required. Air pressure delivers the water to all fixtures and hydrants.

Write for our complete 64-page illustrated catalogue which explains everything. Ask for catalogue No. 14.

Kewanee Water Supply Co., Kewanee, Ill.

No. 32 Broadway, New York City.

820 Marquette Building, Chicago.

404 Equitable Bldg., Baltimore.



This One



DON'TS For Speakers and Writers, and 3500 Words often Mispronounced

Edited by PROF. GEO. W. CONKLIN. Bound in Russia Leather. Sent postpaid for 50c.

Read This Table of Contents

Don'ts for Speakers and Writers.....	7-143	Figures of Rhetoric.....	104-110
Grammatical Don'ts	54-75	Figures of Orthography.....	110-111
Punctuation Don'ts	75-79	Figures of Syntax	111-112
Underscoring	79	Rules of Sentence-Building	112-113
Don'ts Relative to the Construction of Sentences	80-81	Composition Don'ts	113-121
Various "Styles" of Writers.....	81-86	General Suggestions upon Composition..	121-129
Preposition Don'ts or How to Use Prepositions	86-98	Meaning of Latin Words and Phrases...	129-140
Common Word and Phrase Don'ts.....	98-101	Meaning of French Words and Phrases...	140-143
Objectionable Words and Phrases.....	101-104	Correct Pronunciation of 3,500 Words Often Mispronounced	145-226

The editor has performed his work with judgment and good taste.—The Christian Intelligencer.

A careful examination satisfies us, that it is of real value, in short, worth many times its price.—The Mercury.

We commend it as a trustworthy guide which should have a place on the study table.—The Christian Era.

Ninety-nine persons out of every hundred, who look this book through, will be greatly surprised to find how many words they mispronounce every day.—The Evening Times.

CONKLIN'S WRITING DESK BOOK

HAVE I USED THE RIGHT WORD? Consult 15,000 Synonyms and Antonyms. Page 191.
HAVE I SPELLED IT CORRECTLY? Consult 50,000 Words Difficult to Spell. Page 277.
SHALL I USE A CAPITAL LETTER? Consult How to Use Capital Letters. Page 11.
IS THE SENTENCE GRAMMATICAL? Consult Rules of Grammar. Pages 20 and 24.
IS IT PROPERLY CONSTRUCTED? Consult Rules of Construction. Page 32.
HAVE I PUNCTUATED IT CORRECTLY? Consult How to Punctuate Correctly. Page 11.
IS IT CORRECT IN STYLE? Consult Rules of Style and Composition. Pages 33 and 72.
 This volume also contains Forms of Address; Slips of the Tongue and Pen; Abbreviations in Common Use; A Dictionary of Quotations, and much other miscellaneous matter of great value. Bound in Russia leather, 355 pages. Sent postpaid for 50c. "It helps all who write."

CORRECT ENGLISH AND HOW TO USE IT

Thomas H. Russell, LL.B., editor-in-chief of Webster's Imperial Dictionary, did the public a great service when he wrote this book in which there are 1,017 headings treated, and under some of them—plurals, for instance—over fifty every day errors are illustrated and corrected. Who does not make errors in speech? Probably there is no person who does not make an error in speech occasionally. But there are numerous faulty expressions so widely employed as to have secured something of the status of perfect diction. Many people who ought to know better believe them to be proper, and will defend them with promptitude and even passion. All persons, even the cultured, are guilty at times of errors in speech. Therefore everybody will be benefited by studying this handy little volume, which is so obviously useful that it should have simply an enormous sale.—Leslie's Weekly.
 We venture the opinion that there are college presidents in this country who could get help from this volume.—The Tribune, Charlotte, Mich.
 Bound in Russia Leather, Gold Title. Price 50c. Sent postpaid on receipt of price.

CONKLIN'S SHAKSPEREAN MANUAL

If you wish to refresh your memory or appear to know Shakspeare, you must have this book. It has over 2,000 quotations indexed with the principal words so you need remember only one word of a quotation to turn to the 30-page double column index and find it. It also indexes Shakspeare characters, plays, places in which plays were laid, etc., thus making, in short, an invaluable Shakspearean manual. 224 pages, bound in Russia leather, gold title. Price, 50c.

Other Valuable 50c. Books—Ones That You Really Need

- | | |
|---|---|
| Conklin's Who Wrote That? (Prose Selections.) | Conklin's Argument Settler. |
| Conklin's Who Wrote That? (Poetic Selections.) | Hill's Bridge Whist and How to Play It. |
| Conklin's Who Said That? (Famous Sayings.) | Hill's Vest Pocket Hoyle. |
| Conklin's The World's Best Proverbs and Epigrams. | Hill's Rules of Order. |
| Conklin's 50,000 Word Speller and Letter Writer's Manual. | DICTIONARIES AND LANGUAGE BOOKS. |
| Conklin's Civil and Business Law Book. | Hill's Vest Pocket Webster Dictionary. [ary. |
| Conklin's The Way to Think and How to Remember. | Hill's German-English and Eng.-Ger. Diction- |
| Conklin's Familiar Quotations. | Hill's Swedish-English, English-Swedish Dict'y. |
| Conklin's 500 Ways to Make Money. | Hill's French-English and Eng.-Fr. Dictionary. |
| Conklin's Synonyms and Antonyms. | Hill's Spanish-English and Eng.-Span. Diction- |
| Conklin's Rapid Commercial Calculator. | ary. |
| | Hill's Latin-English and Eng.-Lat. Dictionary. |
| | Hill's Italian-English and Eng.-Ital. Dictionary. |
| | Thimm's French Self Taught. |
| | Thimm's German Self Taught. |

Any of the books listed on this page—bound in Russia Leather—will be sent by mail postpaid for 50c in stamps or coin

GEO. P. OGILVIE & CO., Publishers, 167 Randolph Street, Chicago

POPULAR MECHANICS

160 WASHINGTON ST., CHICAGO, U. S. A.

H. H. WINDSOR

EDITOR

SUBSCRIPTION:

In United States, and its possessions, and Mexico, per year, postpaid - \$1.00
To Canada and all countries in the Postal Union, postpaid, per year - \$1.50

All subscriptions are discontinued at expiration
Please examine the date printed on your wrapper

Published Monthly by POPULAR MECHANICS COMPANY
Entered as mail matter of the second class at the postoffice at Chicago, Ill.

Eastern Advertising Office :: 116 Nassau St., New York

The attention of prospective advertisers is called to the policy of this magazine in accordance with which the publisher waives all claim for payment of any advertisement appearing in any issue where the number of copies actually printed and circulated is less than the number printed on the front cover page.

CONTENTS FOR NOVEMBER, 1907

8,000-TON OPERA HOUSE MOVED.....	1193
ELEPHANTS SHOOT THE CHUTES.....	1194
Remarkable Railroad Wreck.....	1194
EXPERTS RISK LIVES IN COMPRESSED AIR EXPERIMENTS.....	1196
Big Battery of Rams.....	1196
PLAY BALL GAME IN BUSY CITY STREETS.....	1197
Obstructing Speed Maniacs.....	1198
Powder Flash Cures Snake Bite.....	1198
Protective Gloves for X-Ray Operators.....	1198
Dump Wagon for Brick.....	1199
Portable Electric Rock Crusher.....	1199
DRESSING FISH BY MACHINERY.....	1199
Magnetic Properties of Steel Ships.....	1200
Funeral Cars in Brazil.....	1200
MAMMOTH GASOLINE WEED BURNER.....	1201
Proper Way to Hand Telephone Instrument to Another.....	1202
Movable Sand Elevator.....	1202
High Seats Impede Auto.....	1202
Artificial Sunlight for Plants.....	1202
GREATEST LOCOMOTIVE EVER BUILT.....	1203
Trouble of Repairing Old Planos Great.....	1203
Nautical Rules for Autos.....	1203
SANITARY GARBAGE WAGON ELIMINATES ODORS.....	1203
PROTECTING PILING WITH CEMENT.....	1204
Electric Fans Restore Asphyxiated Persons.....	1204
Steel Barn Structures.....	1204
Water Trough Costs \$250.....	1205
FLOATING MAMMOTH TUNNEL.....	1205
Wireless 'Phones for Atlantic Squadron.....	1206
UNIQUE FEAT IN BRIDGE BUILDING.....	1207
Automobile Scissor Grinder.....	1207
Brace for Concrete Bridge.....	1208
BREAKING POINT OF TOW-LINES.....	1208
Ties at Termini Panama Canal.....	1208
Potato Digging Machine.....	1209
AUTOMOBILE MILLING AUXILIARY.....	1209
Watch Ticks in a Cake of Ice.....	1209
UNIQUE FRENCH AEROPLANES.....	1210
A GIANT WRECKING STEAMER.....	1210
General Trolley Express Service.....	1212
EXPERIMENTS IN HIGH-SPEED WIRELESS YOUNG MECHANICS IN THE CHILEAN ARMY.....	1213
New Hot Air Fruit Drying Process.....	1213
AUTOMOBILE RUN ON NATURAL GAS.....	1214
Why Riffed Pipe Line Transmits Faster.....	1214
Fall of Quebec Cantilever Bridge Expected by Men.....	1214
Whales Still Hunted.....	1215
THE ARMY IDENTIFICATION TAG.....	1215
New Type of Padlock.....	1215
OUTSIDE SEATS FOR RACING SHELL.....	1215
Concrete for Small Culverts.....	1216
Railway Inspection Cars.....	1217
ELEGANCE OF MODERN STEAMSHIPS.....	1218
Suction Dredge Works Clay.....	1218

Fish Kept Alive Out of Water.....	1219
CONCRETE SHAFT 115 FT. HIGH.....	1219
AN EMPLOYMENT OFFICE THAT COMES TO YOU.....	1220
Arches of Concrete for Mine Roof Supports.....	1220
Folding Launch Cover.....	1220
Concrete Base Saves Poles.....	1221
Preservative Powers of Clay.....	1221
AUTOMATIC EXPRESS CALL.....	1221
FIGHTING PRAIRIE FIRES WITH STEAM PLOW.....	1222
COUPONS EXCHANGEABLE IN FOREIGN COUNTRIES FOR POSTAGE.....	1222
BIG ORE DOCK AT ASHTABULA.....	1223
SKYSCRAPER CITIES IN DANGER OF CONFLAGRATION IN MID-AIR.....	1223
ACETYLENE AS GUARDIAN OF THE SEA.....	1224
Prisoners Make Road Signs.....	1224
REFINING COPPER SCRAP.....	1225
Remarkable Elephants.....	1225
The "Typhonoide".....	1225
Church Built of Cement Blocks.....	1225
STEAM FREIGHT TRAIN FOR THE HIGHWAYS.....	1226
Queer Horse Power Ferry.....	1226
GREAT CHAINS FOR SHIPS.....	1243
BACK-FILLING WITH PORTABLE ENGINE.....	1244
Sound Shadows in Fog Dangerous to Navigation.....	1244
Long-Distance Control of Mechanisms.....	1244
ENGLAND'S FIRST MILITARY AIRSHIP A SUCCESS.....	1245
Concrete Construction for Stockyards.....	1247
"LUSITANIA" FAILS TO BREAK TRANS-ATLANTIC RECORD.....	1247
Curious French Ambulance.....	1247
AMATEUR MECHANICS—	
How to Make Silhouettes.....	1248
How to Walk a Log.....	1248
Home-Made Acetylene Gas Generator.....	1249
Home-Made Disc Record Cabinet.....	1249
Home-Made Pottery Kiln.....	1249
How to Make a Pantograph.....	1251
Circuit-Breaker for Induction Coils.....	1251
An Electric Home.....	1256
Armor as Auto Tire Protector.....	1256

SHOP NOTES.

To Remove Rusted Nut.....	1227
Cement Piers for Scales.....	1227
Special Engine Frame Truck.....	1227
Pulling Arc Light Switch Plugs from a Distance.....	1228
To Print on Tracing Cloths with Rubber Stamps.....	1228
Uniform Heat for Melting Brass.....	1228
Transferring Punch Marks on Boiler Plate.....	1228
What to Prevent in Building a Chimney.....	1229
How to Repair Tire Casings.....	1229
To Remove the Odor of Paint.....	1229
How to Make an Adjustable Boring Bar.....	1229
Sewer Pipe Joints.....	1230
Emergency Tire Testing Tank.....	1230
Changing Pulleys.....	1230
Care of Paint Brushes.....	1230
The Proper Use of Nails.....	1231
A Home-Made Tinsmith's Window Jack.....	1232
Repairing a Broken Cog.....	1232
Handy Tool Holder.....	1233
Excellent Home-Made Muffler.....	1233
Substituting a Shaper for a Power Hack Saw.....	1233
Cleaning Hot Brass.....	1233
Handy Ice Cream Freezer Shelf.....	1234
To Keep Dirt from Sticking to a Shovel.....	1234
New Method of Putting Out a Fire.....	1234
Repairing a Water Closet Trap Valve.....	1234
New Kink in Ladder Making.....	1234
Melting Copper.....	1234
Utility Pipe Vise.....	1235
To Assist in Making Forgings and Welds.....	1235
Three-Horse Evener for Use Without a Tongue.....	1235
Picture Wire for Belt Lacing.....	1235
Home-Made Cement Block Mould.....	1236
Pattern-Maker's Clamp.....	1236
Cleaning Machinery.....	1237
How to Use Dividers for a Square.....	1237
Connecting Iron Pipe to Lead Pipe.....	1237
Home-Made Cableway.....	1237
How to Make a Commutator Press.....	1238
Welding Wide Tires.....	1238
To Drill Tempered Steel.....	1238
Ladder Made of Gas Pipe.....	1239
Equalizing Brush-Holder Springs.....	1239
How to Make a Melting Ladle.....	1239
Heatproof Cement.....	1239
Wire Rope Splicing.....	1240
Home-Made Cooler.....	1241
Quickly Made Carpenter's Clamp.....	1241
Annealing Novo Steel.....	1241
Wood Handle Without a Metal Ferrule.....	1242
How to Make a Boiler Compound Feeder.....	1242

"Everybody Makes His Own : : : Storage Battery"

By using WATSON'S BOOK

STORAGE BATTERIES, THEIR THEORY, CONSTRUCTION AND USE

PRICE \$1.50

For description, see October Popular Mechanics, page 1072. For sale at all Book Stores, or will be mailed, postpaid, by the Publishers, upon receipt of price.

BUBIER PUBLISHING CO. - - Dept. 3, - - Lynn, Mass.

THE GREATEST GOLD DREDGING ENTERPRISE IN THE WORLD

THE YUKON BASIN GOLD DREDGING COMPANY is an international company organized under the territorial laws of the United States, registered and sanctioned by the strict laws of the Dominion of Canada. Its properties are 165 miles river frontage, or more than 10,000 acres on the famous Stewart River, the richest gold bearing placer field in the world. Title absolute from the Canadian Government through William Ogilvie, former governor of Yukon Territory and now president and actual field manager of the Yukon Basin Gold Dredging Company.

THE GOLD DREDGE A WONDERFUL MODERN INVENTION Each dredge put in the field will do the work of 1,000 men, and we propose to install twelve as rapidly as it is possible to make the arrangements. The ground is fully tested and immensely valuable. This is the biggest gold dredging proposition in America. Careful tests covering 30 miles of our leaseholds averaged more than \$1.66 per yard. Fabulous fortunes are being made dredging in California on ground averaging only 15c per yard.

\$10.00 FOR EVERY \$1.00 INVESTED. We consider this stock intrinsically worth par, and that in a reasonable length of time it will be paying large dividends on that amount. A limited amount of full paid, non-assessable stock will be sold for development purposes at 10 CENTS per share; soon to be advanced to 25 cents. Par value \$1.00. Stock may be had on ten monthly installment payments.

Write for prospectus containing minutest details. Write and ask questions. Address

YUKON BASIN GOLD DREDGING CO., 184 SCARRITT BLDG., KANSAS CITY, MO.

Publisher Fails—Forced Sale This is your Gain

Weight
Boxed
75 lbs

Ex-President Cleveland says:

"This History will fill an important place among publications intended to give wider familiarity with historical literature."



OPPORTUNITY KNOCKS AT YOUR DOOR NOW. We are compelled to convert these books into money at once. To protect our interests as finance agents, we have assumed control and offer without reserve the remaining sets of the Publisher's latest and most important publication—"Library of Universal History," fifteen sumptuous volumes, over 5,000 pages, 100 specially engraved maps, 700 beautiful illustrations, copious marginal notes and chronological index. This is a new publication from cover to cover, prepared by a staff of the most famous historians of the world. Cost to produce nearly \$250,000.00. Positively the first edition printed from these new plates, made from type cast expressly for this work. Each volume is 2 inches thick, 7 inches wide and 10 inches high.

Read Our Offer: Beginning with the dawn of recorded thought and tracing the progress of mankind, these Sixty Centuries of Progress leads us step by step through Ancient, Medieval and Modern Times. In this great panorama we see the birth, growth and development, the decay and death of races and nations. The pure, simple and enchanting language used in depicting these great events makes this story of human progress more fascinating than fiction. Young folks will use this work and read it with delight, charmed by its splendid pictures and vivid style.

These 15 massive volumes shipped free

Our Offer! We send the books, complete set, 15 volumes, prepaid, to you at once for five days and \$2 monthly for 10 months for Silk Cloth binding. (This is \$20.50 for the 15 volumes, while the publisher's price was \$45.00.) For 3-4 Red Morocco binding, send us 50 cents within five days and \$2.75 monthly for 10 months or a total of \$28. Publisher's price was \$60. If the library is not perfectly satisfactory after five days' examination in your own home, notify us and we will have it returned at our expense. You run no risk whatever, but act promptly as the sets are going fast. Cut out and mail the coupon herewith, or a copy of it now.

**American Underwriters Corporation,
Finance Agents 240 Wabash Ave., Chicago, Ill.**

P. M.
10-07

**FREE
COUPON**

American Underwriters Corporation,
240 Wabash Av., Chicago.

Please ship to me, prepaid, a complete set of the Library of Universal History, 15 volumes, 3-4 Red Morocco binding, for five days' free examination, as per terms stated by you in

POPULAR MECHANICS

Name

Address

Change binding to cloth if desired.

SELF-EDUCATION

TEACH YOURSELF AND INCREASE YOUR WAGES

ONLY DRAKE'S PLAINLY WRITTEN PRACTICAL BOOKS

CAN TEACH YOU WITHOUT THE AID OF INSTRUCTORS

Every volume positively **UP-TO-DATE** and written in a language so plain that even a child can understand. **DRAKE** is the largest publisher of Modern Mechanical Books for home and shop study in the world. We publish good books on every mechanical subject. Our large illustrated Catalog now ready. Sent free.

FREDERICK J. DRAKE & COMPANY

350 Wabash Avenue CHICAGO, U. S. A.

In ordering our catalog please mention this paper.

Violin Music Free

WALTZ.



To introduce our New Violin Catalog and **SPECIAL VIOLIN OFFER** we will send for the next thirty days our 50 cent music book; contains 24 pieces of copyright music, such as Overtures, Waltzes, Two-steps, etc.; printed on fine paper. We want to get our new handsome illustrated catalog of Violins, Guitars, Mandolins, Musical Supplies, Strings, Bows, etc., in the hands of every Violin player; so if you will send the names of four persons who play the Violin we will send you our music book, free, also our catalog. Write names and addresses plainly and enclose five 2-cent stamps to pay postage and mailing cost of your music book.

E. T. ROOT & SONS,

79 Patten Bldg. (Established 1857) CHICAGO

Train Load of Books

Books to be closed out at less than cost of paper and printing. Binding free.

Failed National Book Concern, Cash Buyers' Union, Merrill & Baker, Colonial Pub. Co.

I bought entire stock of three of these Big Bankrupt Book Houses and a big lot of the other. I am closing it out now at 10c to 50c on the dollar.

Sample Prices

Late copyright books, were \$1.50. My price 35c. List includes The Prospector, The Masqueraders, Conquest of Canaan, Richard Carvel. Hundreds of others at from 35c to 48c.

Encyclopedia Britannica, half morocco binding, installment price \$96.00. My price \$7.75.

Dickens Complete Works, 15 vols., regularly \$15.00. My price \$3.75.

I am closing out at less than half price the following complete works in half morocco bindings: —Dickens, Thackeray, Balzac, Scott, Irving, Dumas, Hugo, Bulwer, Carlyle, Eliot, Cooper, DeFoe, Fielding, Hawthorne, Poe, Reade, Ruskin, Smollett, Gibbon, Guizot, Green, Shakespeare, etc.

Millions of books, thousands of titles. Chance of a lifetime to get almost any book at a discount of from 50 to 90 per cent from regular price while stock lasts.

Books Shipped on Approval

subject to examination in your own home before paying. Every book guaranteed new and satisfactory, or subject to return at my expense. Write for my big Free Bargain List of this stock before ordering. It costs nothing. Will save you money. Postal card will bring it.

DAVID B. CLARKSON, The Book Broker,
1123 Bosch Bldg., Chicago.

POSTAL SCALE \$1.00

Tells at a glance postage in cents on all mail matter. Capacity, 1 pound by half ounces, 3 inches high. Cuts down the stamp bill. We make several styles for the office, store and large business houses, as well as the individual desk. All leading dealers sell them.

Catalogue P free, showing 12 styles.

PELOUSE SCALE & MFG. CO.
132 W. Jackson Boulevard CHICAGO



A School Within Itself

point where the careful student comprehends the complete designing, care and operation of a dynamo or motor, and I chapter on electric automobiles, outlining their construction, care and operation, and all about storage batteries and how to handle them.

There are XX chapters in all, XIX carrying you from the fundamental principles of electricity on through the various branches to a subject in such a manner as to bring clearly to his mind the points he needs to know regarding same. A **DICTIONARY** in back of book will enable him to learn the meaning of any electrical word, term or phrase used in this book, as well as hundreds of others in common use. All required tables necessary in the study are in it.

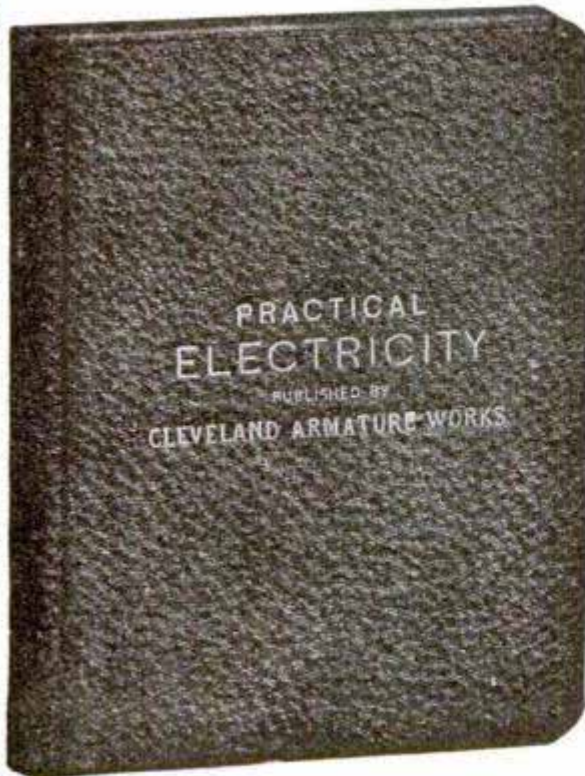


TABLE OF SUBJECTS:

CHAPTER

- I—Wiring
- II—Electric Batteries. Electric Plating.
- III—Magnetism
- IV—The Magnetic Circuit
- V—Magnetic Traction
- VI—Magnetic Leakage
- VII—Energy in Electric Circuit
- VIII—Calculation of Size of Wire for Magnetizing Coils
- IX—Calculation of E. M. F.'s in Electric Machines

CHAPTER

- X—Counter E. M. F.
- XI—Hysteresis and Eddy Currents
- XII—Armature Reaction
- XIII—Sparking
- XIV—Winding of Dynamos and Motors
- XV—Proper Method of Connecting Dynamos and Motors —Self-Excitation and others

\$2.00 PER COPY—FOURTH EDITION—16,000 COPIES SOLD.

The offer we make of refunding money if book is not satisfactory upon examination is **AN UNUSUAL ONE** in connection with the sale of a book. But we have no fear of its return. Your decision will be what thousands of others has been. Money would not buy it if it could not be duplicated. We could print testimonials by the hundreds. It is best to order and be your own judge of its merits.

CLEVELAND ARMATURE WORKS, Cleveland, Ohio.

AMERICA'S GREATEST REPAIR WORKS. Armatures and Fields Wound—Commutators filed,

**"Goodly the covering as thy purse can buy,
For the covering oft proclaims the Engineer."**



Have you ever wanted to cover a piece of steam pipe in a hurry and found yourself without material to do it?

Have you ever wanted to cover a gas or water pipe to keep it from freezing and experienced a lot of trouble?

If you have we are sure you will be interested in "Remanit," the pipe covering which is always ready to put on and requires no experience in applying. By having a bale of it on hand you can cover any kind of pipe at a moment's notice. It is simply wrapped around the pipe, as you can see from the illustration, and for an exposed pipe or when an extra good job is required a muslin or canvas bandage is put on over the "Remanit" and painted. This is so extremely simple that it hardly seems possible a pipe so covered will save more steam than if covered by any other material.

"Remanit" is made of pure silk, carbonized, has no combustible medium, will not burn and is clean.

In an "ad" of this kind it is not possible to give more than an outline, but if you will send for our catalogue and samples you will find out just what "Remanit" is and why it is so largely used in this country and abroad.

J. EDWARD OGDEN CO., Cedar and Washington Sts., NEW YORK



Valuable Book for Letterers

Modern Show Card Lettering, Designs, Etc.

NEW AND REVISED EDITION

A practical treatise on Up-to-Date Pen and Brush Lettering, giving instructions respecting many styles of lettering, position, movement, shading, spacing, designing and arrangement; with illustrations of large and small letter of each alphabet, together with a full analysis and diagrams of making neat and prominent figures off-hand for Price Tickets, etc.

Over 150 illustrations of finished show cards and price tickets are given with practical instruction, outside of a large variety of standard show card alphabets.

This book is far beyond anything ever published in this line. It contains solid, practical common sense instruction—a book that is free from absurd theories and mystifying kinks and contains 2,000 advertising Phrases for Card Signs, Posters, etc.

The price of the book is but \$1.00 delivered to your address. If you find book not as represented, you have the privilege to return the same in good condition within three days, and I will return the money.

Address **W. A. THOMPSON, Pontiac, Mich.**

A NEW MONTHLY MAGAZINE

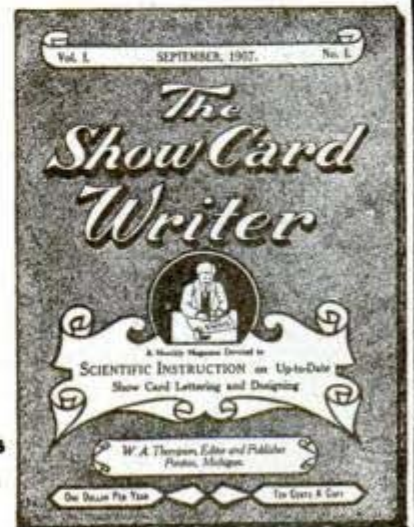
The accompanying illustration shows a small outline of the cover page design of a new publication—"The Show Card Writer," a handsome new illustrated monthly. The first number will appear before September First (about August 15th).

No Card Writer can afford to be without it a single month. It will be a credit to the craft, an inspiration to the worker and a delight to the eye. Every page, every article, every illustration will be clear and distinct. It will show you how to improve your skill, how to enlarge your field and how to make money.

One Dollar per Year Ten Cents a Copy No Free Samples

Write for prospectus. Address

W. A. Thompson, Publisher, Pontiac, Mich.



How About That Job?

Which means fastenings to Brick, Stone, Marble, Tile, Concrete or other Masonry?

Perhaps you mean to use "wood plugs" or the messy, tedious "leading-in" process. **Don't!** There's a quicker, surer, cleaner way that **costs you less**, saves you time and labor, and guarantees for you a job 100 per cent better looking and absolutely dependable. The answer is:

STAR EXPANSION BOLTS AND STAR SCREW ANCHORS



Made of Malleable Iron or Lead Composition for use with every size of Wood, Log or Machine Bolts or Screws

DISTINCT ADVANTAGES—Smallest possible Drill Hole for insertion. Simple construction and application. Holding Power which may be depended upon as long as the walls last. **AND**, a clean-cut, finished appearance.

It will be worth money to you to sit right down and tell us all about your requirements—just what your fastenings are to be. We are interested and will be glad to send you Catalog and Samples by return mail.

Star Expansion Bolt Co.

Factory and General Offices

142 Lake Street
CHICAGO, ILL.

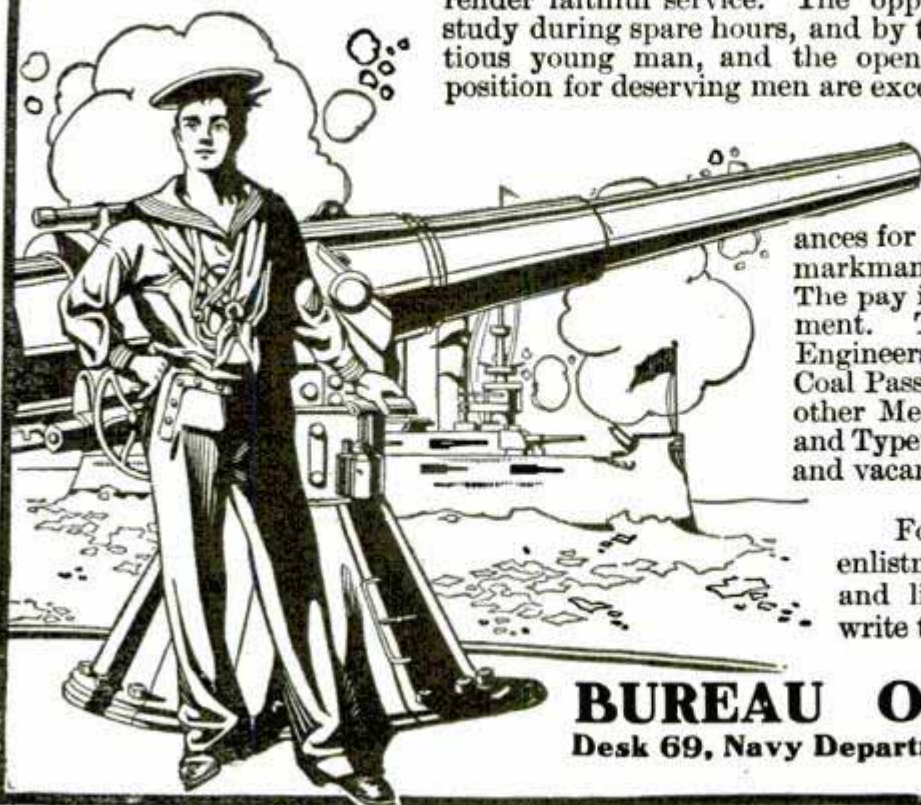
Humphrey, Trask and Second Streets
BAYONNE, N. J.

147 Cedar Street
NEW YORK CITY

Opportunities

For Machinists, Engineers, Coppersmiths, Carpenters, Firemen, Coal Passers, Electricians and Mechanics of various Trades in the Navy.

You need never worry about being laid off when you are in the Navy; you are sure of permanent, healthful work, with pay equal to or better than that earned in civil life, as long as you render faithful service. The opportunity for self-improvement by study during spare hours, and by travel, should appeal to any ambitious young man, and the openings for advancement in pay and position for deserving men are excellent.



In addition to the regular pay—which ranges from \$16 to \$70 a month, practically free of living expenses—there are extra allowances for special duty, for skill in signalling, marksmanship, sub-marines, extra duty, etc. The pay is materially increased on re-enlistment. There are good openings now for Engineers, Machinists, Firemen, Electricians, Coal Passers, Coppersmiths, Carpenters and other Mechanics, as well as Stenographers and Typewriters, with good pay at the start, and vacancies in higher ratings.

For full information about the Navy, enlistment, pay, pension, retirement, and list of Navy Recruiting Stations, write to

BUREAU OF NAVIGATION
Desk 69, Navy Department WASHINGTON, D. C.

POPULAR MECHANICS

SHOP NOTES



These books are a perfect gold mine of information for every one interested in mechanics or who uses tools for pleasure or as an occupation. Of equal value and help to the professional mechanic and the amateur.



200	Pages	Vol. I, "Shop Notes for 1905"	385	Illustrations
228	Pages	Vol. II, "Shop Notes for 1906"	555	Illustrations
228	Pages	Vol. III, "Shop Notes for 1907"	580	Illustrations

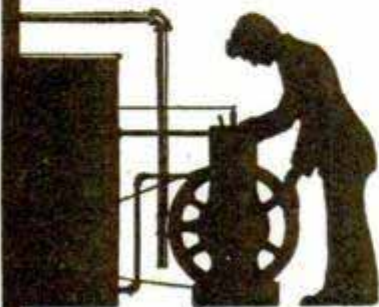
Vol. IV, "Shop Notes for 1908," Ready December 1

THE PRACTICAL EXPERIENCE OF HUNDREDS OF EXPERTS CONDENSED IN THREE VOLUMES

*"Written so you can understand it"
Price 50 Cents per Volume, Postpaid
or Order From Your Newsdealer*

Each Volume Contains Entirely Different Matter From That in the Other. In Ordering State Which Volume is Wanted.

POPULAR MECHANICS
160 Washington St., CHICAGO



What Mechano-Therapy Is—

Its Wonderful Results

MANY people are not aware of the great healing power that this form of treatment possesses.

As indicated by the name, Mechano-Therapy is the stimulation of physiological action by mechanical and other means for the purpose of establishing a normal condition of the body. Its success has been most marked in cases where the medical profession have failed. It is employed in nearly all cases of chronic diseases, contusion, adhesion, exhaustion, fracture (after knitting), for the preservation of health, for the development of the physique, for the postponement of old age, and all nervous diseases. For rheumatism, headache, lumbago, sciatica, dyspepsia, constipation, paralysis, catarrh and heart disease, the most astonishing results have been secured. Mechano-Therapy heals as the body heals—in accordance with natural law—it is the science of drugless healing. The old ways of combating and curing disease have given so little satisfaction, especially in chronic cases, that the medical profession have been obliged to seek more effective methods—they were found in Mechano-Therapy. The Mechano-Therapist uses as his drugs a scientific combination of food, circumstance, idea, water and motion. The body is compelled to do its own healing with its own forces.

The basis of its practice is manual manipulation—one of the oldest remedial measures known and one of the most important. Every one is a devotee of this art unconsciously. When you bump your knee, you rub it instinctively and it feels better. But scientific manipulation is not mere "rubbing." It is based on principles which must be understood and properly applied. The Mechano-Therapist employs the best parts of Osteopathy and the great Swedish Movements, but goes farther and uses all the natural means for the alleviation of human suffering. It calls vibration and suggestion into play.

So successful have these natural methods proved, where medicine and surgery have failed, that the utmost faith is now being placed in them. The most eminent physicians are giving them unqualified endorsement. The methods have been classified and reduced to a science—the science of Mechano-Therapy. And this science is now being taught by correspondence by the American College of Mechano-Therapy, Chicago.

Its graduates are everywhere in demand because good Mechano-Therapists are scarce. The rewards of this profession are making them independent for life.



**Mr. Wm. C. Walker, M.T.,
of Chicago, says:**

Gentlemen:—"The practice of Mechano-Therapy I find to be most pleasing and profitable, and would advise any young man or woman to take it up at once, if they are looking for pleasant and profitable employment where beneficial and far-reaching results can be rendered to humanity.

"Since my graduation from the American College of Mechano-Therapy I have been successfully treating all manner of diseases, and it is a great surprise to myself the results I am getting. I have a nice profession and am in demand everywhere, and the compensation is often eight to ten times greater than it was under my old occupation."

Mr. Walker is only one of many who have bettered themselves financially and socially. You can do the same if you will act now. Women make just as much of a success as a doctor of Mechano-Therapy as men. They are gifted by nature and temperament to follow this high calling.

Treatments by Mechano-Therapy are pleasant and easy to give. You have no idea of the wonderful results produced by a Mechano-Therapist. Our course covers all the details that the student needs to know. Nothing that you'll forget. It is written in a simple, easy, non-technical style. Covers all the subjects from Anatomy to Manual Manipulation, Swedish Movements, Vibration, Hydro-Therapy, Dietetics, Schott's System, Ling's Method and Suggestive Therapeutics. You can cure dozens of chronic diseases, rheumatism, lumbago, headache, weakness or stiffness of any kind. Every man and woman should take this course if simply for the information it gives in showing you how to take care of your own body. The most prominent business men and physicians endorse it.

Special Rates Now

Write Today

For a limited period we are offering special rates. Be the first doctor of Mechano-Therapy in your community and secure all the profits. Don't let someone else make all the money you ought to make. Your name and address on the coupon attached mailed to us at once brings you our new prospectus telling all about our course and Mechano-Therapy—all there is to know. Do it now.

American College of Mechano-Therapy,

(Chartered)

Dept. No. 951
120-122 Randolph Street,
Chicago

Be a Doctor of Mechano- Therapy

Earn Big Money We Teach by Mail

YOU don't need to work for someone else all your life. Learn to be a Mechano-Therapy doctor and be independent. We issue authorized diplomas to our graduates. The opportunities to make money in this new and fascinating profession are everywhere—the field is unlimited. You don't even need to leave home to make your fortune.

Anyone of average intelligence can learn the profession of Mechano-Therapy under our correspondence plan of instruction easily and quickly and establish himself in a dignified and money-making practice as soon as he receives his diploma.

The practice of Mechano-Therapy is an elevating and highly paid profession, one in which there is no chance for failure. It gives

you a standing in your community that few attain.

We teach you Mechano-Therapy in all its branches by mail. Take you step by step through the course until you are master of every detail. The study is intensely interesting. You can pursue it during your spare moments or devote all your time to it. We show you how to start after you graduate and help you in every way. You have no expensive equipment or text books to buy, and you don't have to spend three or four years to learn Mechano-Therapy—only a few months' time is required.



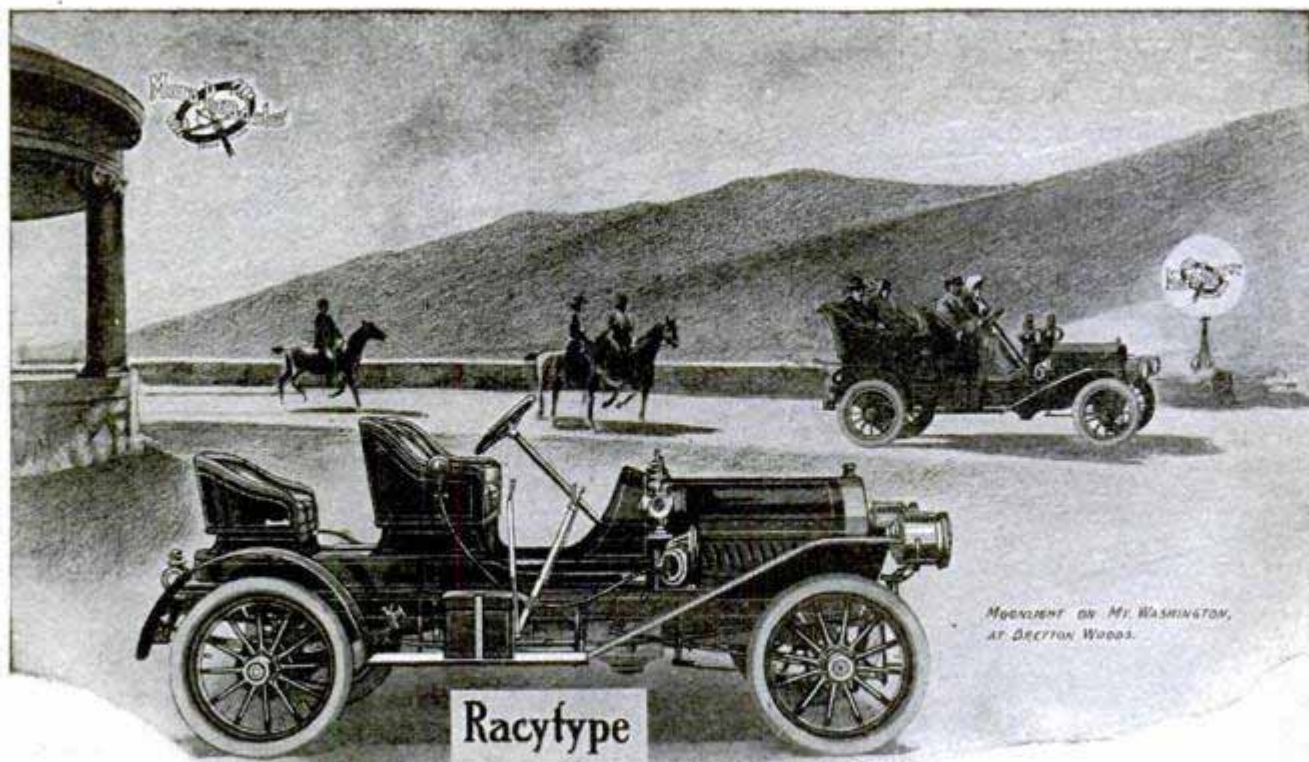
Home of American College of
Mechano-Therapy



Without obligation on my part please send me your special reduced price offer and full information about your course in Mechano-Therapy.

Name.....

Address.....



MOONLIGHT ON Mt. WASHINGTON,
AT DEFFON WOODS.

Racytype

Still Another Victory

Over six thousand miles without a single adjustment to power plant; that's the record which motor car authorities challenge all Europe to equal. Moreover the car is now running with original New York, Chicago and Cleveland Motor Clubs seals intact.

A "Mechanically Right" MORA power plant and MORA Mud Proof Construction is what made this feat possible.

When you own a

Mora

MECHANICALLY RIGHT.

you're assured of a right racy car equally suitable for town or cross country running.

Its low speed motor runs smoothly on high gear as slow as four miles an hour, also as fast as most drivers care to go.

Wheel base, 98 inches; weight, 1750 pounds; 24 horse power; La Coste magneto. Price, \$2,300.

Write for "The Sealed Bonnet," free. Being a complete story of the most wonderful world's endurance record ever created in motor car history. And "it's still (quiet) running."

See Sec. D, A. C. A. Show, Grand Central Palace, N. Y., Oct. 24th to 31st.

Mora Motor Car Co.

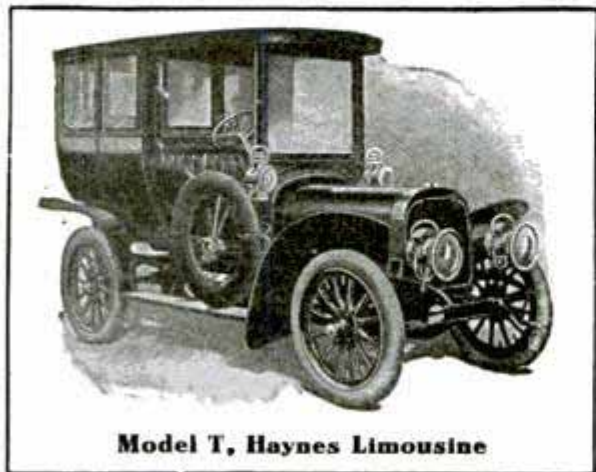
23 Mora Pl., Newark, New York, U. S. A.



The
Sealed
Bonnet

HAYNES

RELIABILITY

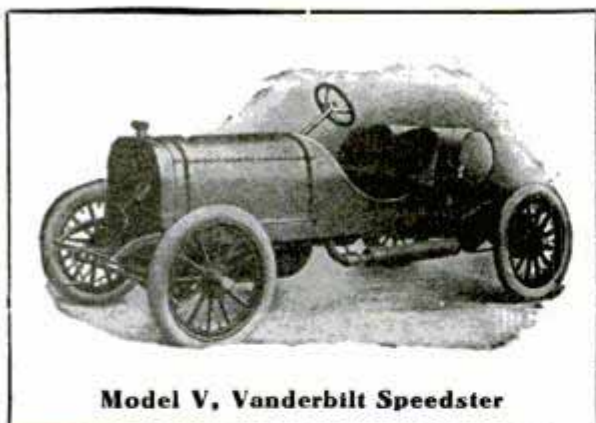


Model T, Haynes Limousine

The makers of the Haynes have been developing their car for 13 years. They know their car through and through. Year after year they have seen their old cars come back after varied use and have spotted here and there chances for improvements.

Their experience has developed for 1907 a car that can be safely advertised for reliability—a car that can be trusted. It contains no parts not made in the Haynes Factory, no principles that are unfamiliar to the Haynes designers.

In these days, when every blacksmith is buying parts and assembling cars under a private trademark, the fact that the Haynes factories really make everything in their car is a guarantee of Haynes reliability.



Model V, Vanderbilt Speedster

The Haynes Standard 50 H. P. Touring Car for 1907, Model "T," the highest powered shaft driven car built. Price, \$3,500.

Send at once for full information and advance specifications. Address, Desk P-P.

HAYNES AUTOMOBILE CO., Kokomo, Ind.

Oldest Automobile Manufacturers in America. Members A.L.A.M.

New York—1715 Broadway. Chicago—1420 Michigan Ave.

HAYNES

YOU can Refinish ^{Your} Old Floors

So They Will LOOK LIKE New



Section of flooring—cracks in lower portion filled with Johnson's Crack Filler.

Make your old floors match your woodwork or furniture.

To prove how easily, how pleasantly and how cheaply you can make your home artistic, we have prepared a handsome illustrated booklet describing Johnson's Wood Finishes, which we will send you upon request, so that every reader of this

publication can learn how easily the home may be beautified.

This booklet gives full instructions, showing exactly how to refinish wood so you can't possibly make a mistake. It tells all about Johnson's Electric Solvo, which instantly removes all old paint and varnish from wood; Johnson's Crack Filler for filling unsightly cracks; it immediately hardens and will not shrink; Johnson's Wood Dye colors the wood any desired shade; Johnson's Prepared Wax produces a beautiful, artistic, durable polish.

You can dye your floors practically any shade to match your woodwork or furniture. Colors are Light Oak, Brown Weathered Oak, Green Weathered Oak, Forest Green, Moss Green Flemish, Brown Flemish, Bog Oak, Mission Oak, Mahogany.

Don't put it off; send coupon below, while you think of it, for this 48-page color booklet—"The Proper Treatment for Floors, Woodwork and Furniture," sent FREE, prepaid.

COUPON—CUT ON THIS LINE

S. C. JOHNSON & SON, Racine, Wis.

"The Wood-Finishing Authorities."

Please send me FREE copy of your book, "The Proper Treatment for Floors, Woodwork and Furniture." It is understood that this request does not incur any obligation on my part.

Name

Town and State

The Earning Power of Money Invested in Kornit

Most Satisfactory Progress Being Made At Our New Factory

HERE is a Financial Opportunity to make an investment in an up-to-date, energetic, money-making, industrial manufacturing company, which owns all the United States patents, processes and exclusive rights for producing Kornit, a product never before manufactured nor sold in this country. The demand for Kornit is great and the profit of manufacturing and selling is ENORMOUS. Read every word of this announcement and ACT AT ONCE.



THE STORY OF KORNIT

By President CHARLES E. ELLIS

KORNIT was invented by JOHANN GUSTAV BIERICH, a subject of the Czar of Russia, residing at Menkenhof, near Lievenhof, Russia, and is a homogeneous Horn or Hoof substance. Kornit is produced by grinding horn and hoof

shavings and waste into a palpable powder and then pressing under heavy hydraulic pressure with heat into a homogeneous slab. This slab produces a substance which can be sawed or turned the same as ordinary wood. It is of a beautiful black consistency and IS EXTREMELY VALUABLE as a NON-CONDUCTOR FOR ELECTRICAL SUPPLIES. It is a matter of record that the electrical industry in this country AT THIS TIME DOES NOT HAVE a satisfactory material for heavy or high insulating purposes. A slab of Kornit one inch thick was tested in Trenton, New Jersey by the Imperial Porcelain Works and was FOUND TO HAVE RESISTED 96,000 VOLTS OF ELECTRICITY. It may be interesting to note here that the heaviest voltage which is transmitted in this country is between Niagara, Buffalo and Lockport, New York. The voltage transmitted by this com-

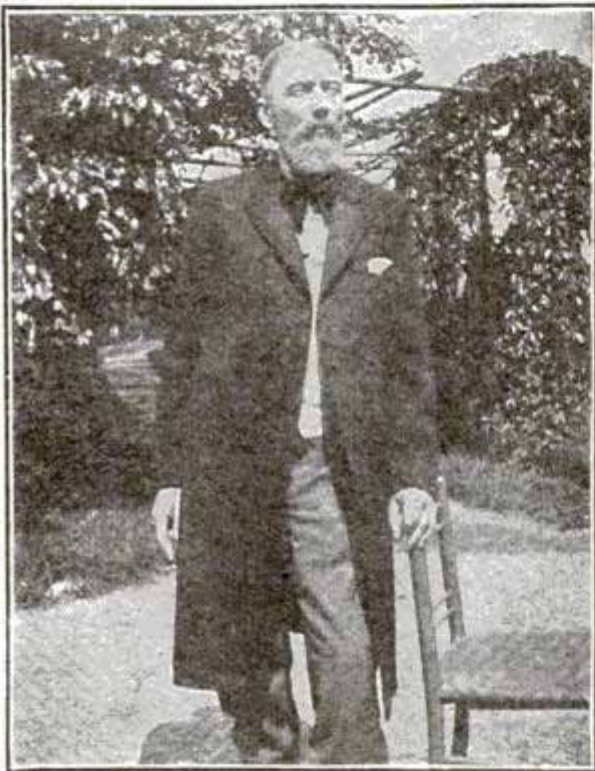
pany is between 40,000 and 50,000 volts. Kornit is equally as good as a non-conductor for electrical purposes and supplies as is hard rubber.

The average price of hard vulcanized rubber for electrical purposes is to-day considerably over one dollar per pound—at the present writing something like \$1.25 per pound.

KORNIT CAN BE SOLD AT TWENTY-FIVE CENTS PER POUND, and AN ENORMOUS profit can be made at this price, so that it CAN EASILY BE SEEN that where Kornit is EQUALLY AS GOOD and AS A MATTER OF FACT, in many instances, a BETTER non-conductor than hard rubber, it can compete in every case where it can be used with great success on account of its price. For electrical panel boards, switchboards, fuse boxes, cutouts, etc., there are other materials used, such as vulcanized paper fibre, slate, marble, etc. A piece of vulcanized paper fibre, 3x4x1 inch in lots of 1,000 brings 20 cents per piece. A piece of KORNIT of the SAME DIMENSIONS could be sold with the ENORMOUS PROFIT OF OVER 100 PER CENT. at ten cents. The absorptive qualities of Kornit render it such that IT IS FAR PREFERABLE to that of vulcanized fibre. It will not maintain a flame. Of all the materials which are now in the electrical market

for supplies and insulators there is, as we have stated above, none that are satisfactory. Kornit will fill this place. Its tensile strength per square inch averages from 1,358 pounds to 1,811 pounds, which the reader can readily see **IS MORE THAN SATISFACTORY**. This test was made by a well-known electrical engineer, who is now acting in that capacity for the United States Government, with a Standard Reible Bros. Testing Machine.

Waste horn and whole hoofs are being sold by the ton to-day principally only for fertilizing purposes. There is one town alone, Leominster, Mass., where they have an average of eight tons of horn shavings every day. These waste horn shavings are now only being sold for fertilizing material. These eight tons of horn shavings manufactured into Kornit and sold for electrical purposes would easily bring \$3,000. At this price it would be



MR. JOHANN GUSTAV BIERICH, THE INVENTOR OF KORNIT, IN HIS SUMMER GARDEN AT MENKENHOF, RUSSIA.

selling for less than one-fifth of what hard rubber would cost, and about one-half what other competitive materials would sell for, even though they would not be as satisfactory as Kornit.

Kornit has been in use in Russia about four years. In Riga, Russia, which is the largest seaport town of Eastern Russia, the Electrical Unions there are using Kornit with the greatest satisfaction, finding it preferable to any other insulating material.

The expense of manufacturing Kornit from the horn shavings is not large, as the patentee, Mr. Bierich, has invented an economical and satisfactory process which produces an article that in the near future will be used

in the construction of almost every building in this country.

Besides electrical insulators, Kornit can be used for the manufacturing of furniture, buttons, door handles, umbrella, cane, knife and fork handles, brush and sword handles, revolver handles, mirror backs, picture frames, toilet accessories, such as fancy glove boxes, jewel cases, glove stretchers, shoe lifts, etc., office utensils such as paper knives and penholders, ink stands, pen racks, medical instruments such as syringes, ear trumpets, etc.; pieces for games, such as draughts, chessmen, dominoes, checkers, counters, chips, cribbage boards, etc.; telephone ear pieces, stands, etc., piano keys, typewriter keys, adding machine and cash register keys, tea trays, ash trays, scoops, mustard and other spoons, salad sets, cigar and cigarette cases, cigar and cigarette holders, match boxes, and hundreds of other useful and ornamental articles, all at a large and remunerative profit.

The Great Demand for Kornit in this Country

THERE is one manufacturer **ALONE** here in New York that uses 60,000 square feet of insulating material for panel boards every year. He is now using slate and marble, but **IT IS NOT SATISFACTORY**, for the reason that in boring and transportation **IT BREAKS SO EASILY**. **KORNIT WILL ANSWER THE PURPOSE OF MANUFACTURING PANEL BOARDS VERY MUCH MORE SATISFACTORILY**. On 60,000 square feet of Kornit there would be a net profit of over \$30,000, or 50 cents for every square foot used. **THIS ONE EXAMPLE** is cited to show you **THE ENORMOUS PROFITS** which can be made. There are a great many other panel and switchboard manufacturers in this country. You may be interested to know that a panel board is a small switchboard. There is one or more on every floor of all large buildings where electricity is used. They each have a number of switches mounted on them, so that those in charge can turn certain lights on or off, and by these panel boards all the electrical power in the building is controlled. They must be of a reliable non-conducting material. Kornit can be used for this purpose almost exclusively. The largest electrical manufacturing concerns in Riga, Russia, **ARE USING KORNIT ONLY FOR THIS PURPOSE**, after having tried all other so-called non-conducting compositions. The electrical trades alone can consume a great many tons of Kornit every day in the year. If only two tons of Kornit is manufactured and sold every working day in the year **IT WILL ENABLE THE KORNIT MANUFACTURING COMPANY TO PAY 16 PER CENT. DIVIDENDS EVERY YEAR**. Of course, if four tons a day are sold the dividends would be 32 per cent. per year. **THIS IS NOT IMPROBABLE**. **AN EXPERT ELECTRICAL ENGINEER** who holds one of

the most responsible positions here in New York City made the statement, after thoroughly examining and testing Kornit for electrical purposes, that in his most conservative estimation there can be ten tons of manufactured Kornit sold every working day in the first year. This would mean that the Kornit Manufacturing Company would pay a dividend out of its earnings the first year of over seventy-five per cent (75%). This is probably more than will be paid the first year, but there certainly seems to be a good prospect of paying a large dividend the first year.

THERE WILL BE SUCH AN ENORMOUS DEMAND FOR KORNIT AFTER IT BECOMES INTRODUCED THAT FROM YEAR TO YEAR THE DIVIDENDS EARNED WILL BECOME LARGER AND LARGER. THIS IS

GUSTAV BIERICH, IN RUSSIA. These patents **HAVE BEEN BOUGHT** from Mr. Bierich, and **ARE DULY TRANSFERRED TO THE KORNIT MANUFACTURING COMPANY** and the same is **DULY RECORDED IN THE PATENT OFFICE OF THE UNITED STATES.**

We Are Building A Fine Factory

ON March 1, 1907, our Factory, which had just been thoroughly equipped and completed, was burned to the ground!

Since that time we have purchased the Real Estate and are now building **OUR OWN** Factory. It is promised that it shall be finished



KORNIT FACTORY, NEWARK, N. J. (BELLEVILLE STATION), ENTIRELY CONSUMED BY FIRE, MARCH 1, 1907.

THE BEST OPPORTUNITY TO MAKE AN INVESTMENT THAT YOU HAVE EVER HAD.

It is a well-known fact that **THE MOST LEGITIMATE and PROFITABLE way to MAKE MONEY** is by manufacturing some product that is **"NECESSARY"** and **ONE THAT CAN BE FULLY CONTROLLED** so that nobody else can manufacture the same article. Look at Sugar (which is protected by a high tariff); at Standard Oil, the Telephone, the Telegraph, and we might go on and enumerate many more monopolies. **THEY ARE THE BIG MONEY MAKERS OF TO-DAY. KORNIT CANNOT BE MANUFACTURED BY ANYBODY IN THIS COUNTRY EXCEPT OURSELVES OR OUR AGENTS.** We own all the patents issued by the **UNITED STATES GOVERNMENT** to the inventor, **MR. JOHANN**

and in working order during the present month. All our machinery is ordered and the greatest part is already completed ready to install as soon as our new Factory Building is ready.

A few shares obtained now may be the foundation for a fortune of the much-desired income for support in the unknown years that are to come. We leave it to you if it would not seem good judgment to take immediate advantage of this opportunity. Anyway, please write me at once and let me know just what you will do. If it is not possible for you to take shares now, write me and tell me how many you would like and how soon it will be convenient for you to do so, provided I will reserve them for you. As soon as I receive your letter I will answer it **WITH A PERSONAL LETTER AND WILL ARRANGE**

MATTERS AS YOU WISH TO THE BEST OF MY ABILITY.

REMEMBER, I HAVE A GREAT MANY THOUSAND DOLLARS INVESTED IN THE KORNIT MANUFACTURING COMPANY, and the minute you buy a share or more in this Company, we become CO-PARTNERS as CO-SHAREHOLDERS. It is for our mutual benefit to watch and guard each other's interests. I WILL BE GRATEFUL IF YOU WILL WRITE ME TO-DAY, so that I may know just what you will do.

I know you will agree with me that you have never had presented to your notice a better opportunity to make an investment where such large profits can be made because of the exclusiveness of control and the great demand and the low cost of the raw material, which is now almost practically thrown away. Join me in this investment, and I assure you that it is my sincere belief that in the near future you will say, "That is the day I made the most successful move in my whole life."

My Offer to You To-day

THE KORNIT MANUFACTURING COMPANY is incorporated under the laws of New Jersey, and is capitalized with 50,000 fully paid non-assessible shares at \$10 each. It is my intention to sell a limited number only of these shares at the par value of \$10 each. Ten dollars will buy one share. Twenty dollars will buy two shares. Fifty dollars will buy five shares. One hundred dollars will buy ten shares. One thousand dollars will buy one hundred shares, and so on. After you have bought one or more shares in the Kornit Manufacturing Company you may feel, as I do, that you have placed your savings where they will draw regular and satisfactorily large dividends.

I should not be a bit surprised if these shares paid dividends as high as one hundred per cent. in the not far distant future. Consequently, a few dollars invested now in the shares of the Kornit Manufacturing Company will enable you in the future to draw a regular income from the large profits of the Company as they are earned. The dividends will be paid semi-annually, every six months, the first of May and November of each year. This is one of the best opportunities you will ever have presented to you in your whole lifetime. I have invested a great many thousand dollars in The Kornit Manufacturing Company, and I feel sure it is one of the best investments I have ever made. I can truthfully say to you that I fully believe that you will be more than pleased with your investment and that you will never be sorry. Remember, that you have here an opportunity to become interested in a large industrial manufacturing concern manufacturing a product with an exclusive

monopoly, which has never before been manufactured or sold in this country.

Remember, that it is by no means an experiment, as it has been successfully manufactured and sold for over four years in Russia at a large profit, and the manufacturer and inventor recently wrote that the demand is increasing every day beyond the capacity of their manufacturing facilities.

Now is the time for you to take advantage of this magnificent opportunity to make an investment in these shares. I EARNESTLY BELIEVE that in a few years THESE SHARES WILL BE WORTH FROM FIFTY DOLLARS TO ONE HUNDRED DOLLARS each on account of THE LARGE DIVIDENDS which the company will earn and regularly pay each and every six months. It is a well-known fact that shares that pay fifty (50) to one hundred (100) per cent. dividends will readily sell in the open market for \$50 to \$100. THE OUTLOOK FOR THE KORNIT MANUFACTURING COMPANY is such that it seems impossible for the earnings to fall far short of these figures. If the company only makes and sells two tons of Kornit a day for the first year and made a profit of only \$200 per ton it would mean a profit of over sixteen per cent. (16%) the first year. If this business were doubled the second year, of course the earning capacity would double and the dividends would be over thirty-two per cent. (32%). Prominent and well-known Electrical Engineers assure me that this product cannot help and is bound to make enormous profits. I would recommend that you send for as many as you wish at once. You, in my conservative opinion, can safely count on the large earning capacity of these shares. I will at once write you a personal letter with full information, and send you our illustrated book, "A Financial Opportunity," containing a score of photographs of the Kornit industry, taken in Russia. Please let me hear from you.

Yours very truly,

CHARLES E. ELLIS

President

603-605 West 43rd St., New York City, N. Y.

Mr. Ellis, besides being President of this company, is also President of two other large and successful companies, owning shares therein valued conservatively at over \$250,000. Mr. Ellis has other investments in New York City real estate, bonds, stocks and mortgages to the amount of many more hundreds of thousands of dollars. Any bank or mercantile agency will tell you his guarantee is as good as gold. This is a successful man who wishes you for a Co-partner as a Shareholder and Dividend Receiver in this company. Remember, you will do business personally with Mr. Ellis in this matter.

"We Teach The World"



The World's Schoolhouse

Everywhere, in all corners of the earth there may be found I. C. S. students—students who are studying for better positions, larger salaries, successful lives, and happy self-dependent old age. There are over a million of them—just think of it, more than 20 times as many students as the largest American university has had in 270 years! You can find them in the commercial offices of New Zealand; the mines of South Africa; the machine shops of England; and the manufactories of North America. Men in all conditions of life, from the miner working long hours each day in the mines at small wages and with a large family to support, to the salaried official who wishes to broaden his knowledge to take advantage of opportunities for further promotion. We have enabled thousands upon thousands of them to advance in our 16 years of experience.

What does this mean to YOU? It means that, no matter what your circumstances are, the I. C. S. offers you today an easy, cheap, and sure way to secure advancement—the most practical way in the world.

These are not mere idle words; they are absolute facts proved by actual statistics. Let them sink into your mind, and if you really and seriously would like to better your position and earnings, send us the coupon below. It costs you nothing to do this much if you do it NOW.

International Correspondence Schools
Box 872, Scranton, Pa.

Please explain, without further obligation on my part, how I can qualify for a larger salary and advancement to the position before which I have marked X.

Bookkeeper	Mechanical Drafts.
Stenographer	Telephone Engineer
Advertisem't Writer	Elec.-Lighting Supt.
Show-Card Writer	Mechanical Engineer
Window Trimmer	Surveyor
Commercial Law	Stationary Engineer
Illustrator	Civil Engineer
Civil Service	Building Contractor
Chemist	Architectural Drafts.
Textile Mill Supt.	Architect
Electrician	Structural Engineer
Electrical Engineer	Bridge Engineer
	Mining Engineer

Name _____

St. and No. _____

City _____ State _____

POPULAR MECHANICS

Vol. 9. No. 11. CHICAGO, NOVEMBER, 1907.

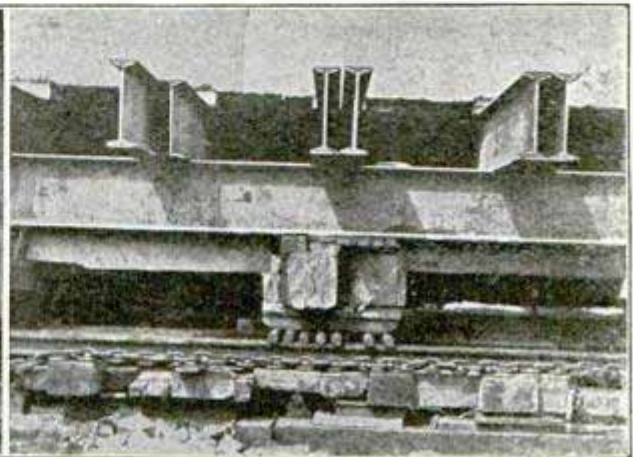
10 Cents a Copy
\$1.00 a Year

8,000-TON OPERA HOUSE MOVED

Big Six-Story Building Travels 300 Ft., Turning Half Way Round in its Journey



Working the Turn-Screws

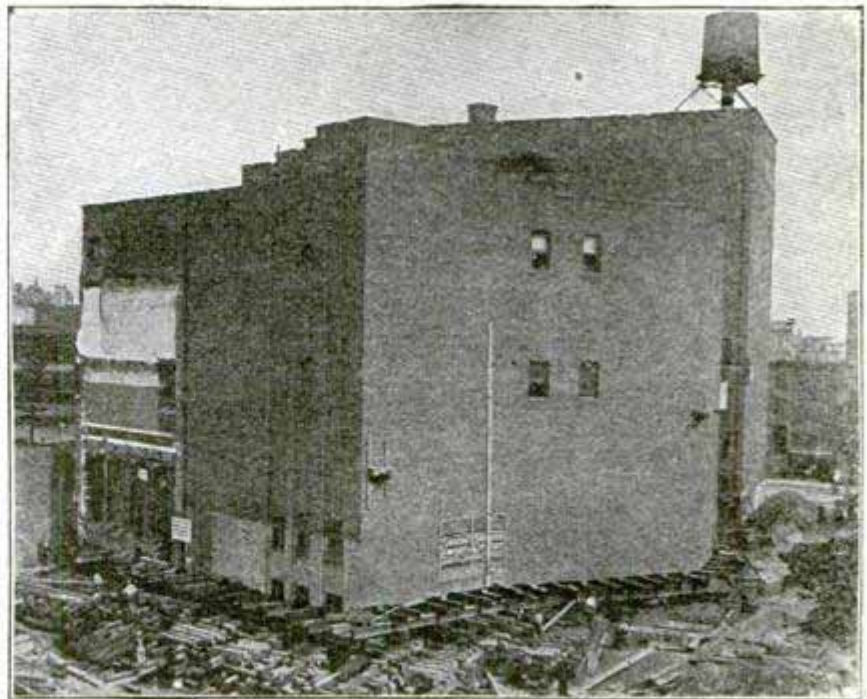


Steel Beams and Rollers

For a distance of 300 ft., at a rate of 10 ft. each day, an 8,000-ton opera house building, approximately 6 stories in height, has been pushed along on its wearisome way to a new site, its titanic bulk unceremoniously kicked in the back by 25 powerful, hand worked turn-screws.

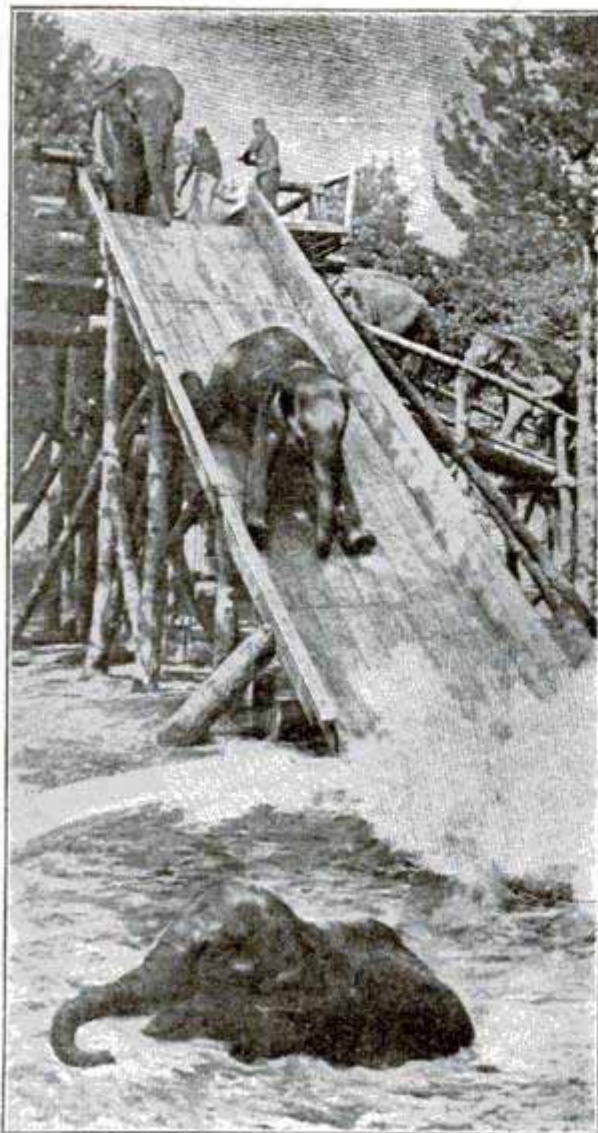
This great feat, considered the most gigantic of its kind ever undertaken, has just been accomplished in Brooklyn, after a little over six weeks of work. To move the big structure 1,600 screws for lifting, 1,600 steel rollers on which it moved, and 450 steel beams as temporary foundation were used. At a given signal 25 men, working in unison, turned the screws with crowbars. The structure is of brick and stone, 165 ft. long, 85

ft. wide and 95 ft. high. To rest the building squarely upon its new foundation it was necessary to turn it in a semi-circle. The moving of the building was necessitated because its site



The Great Structure of Brick and Stone

obstructed the line of a railway extension.



ELEPHANTS SHOOT THE CHUTES

An elephant can be trained to do many surprising things, an instance of which is seen in the illustration. An animal naturally is fearful of any except what seems a secure support, and the larger the animal the more keenly this instinct seems to be developed.

Occasion was had not long since to lead a very large elephant across a wooden bridge which was getting old. Upon reaching the structure he stopped, tested it gently with one foot and gave a snort. No amount of urging had any effect. He simply would not cross. After exhausting all efforts the bridge was strengthened, after which he consented to use it.

This natural cautiousness makes the training of a herd of elephants to shoot the chutes a really remarkable accomplishment. The exhibition may be seen

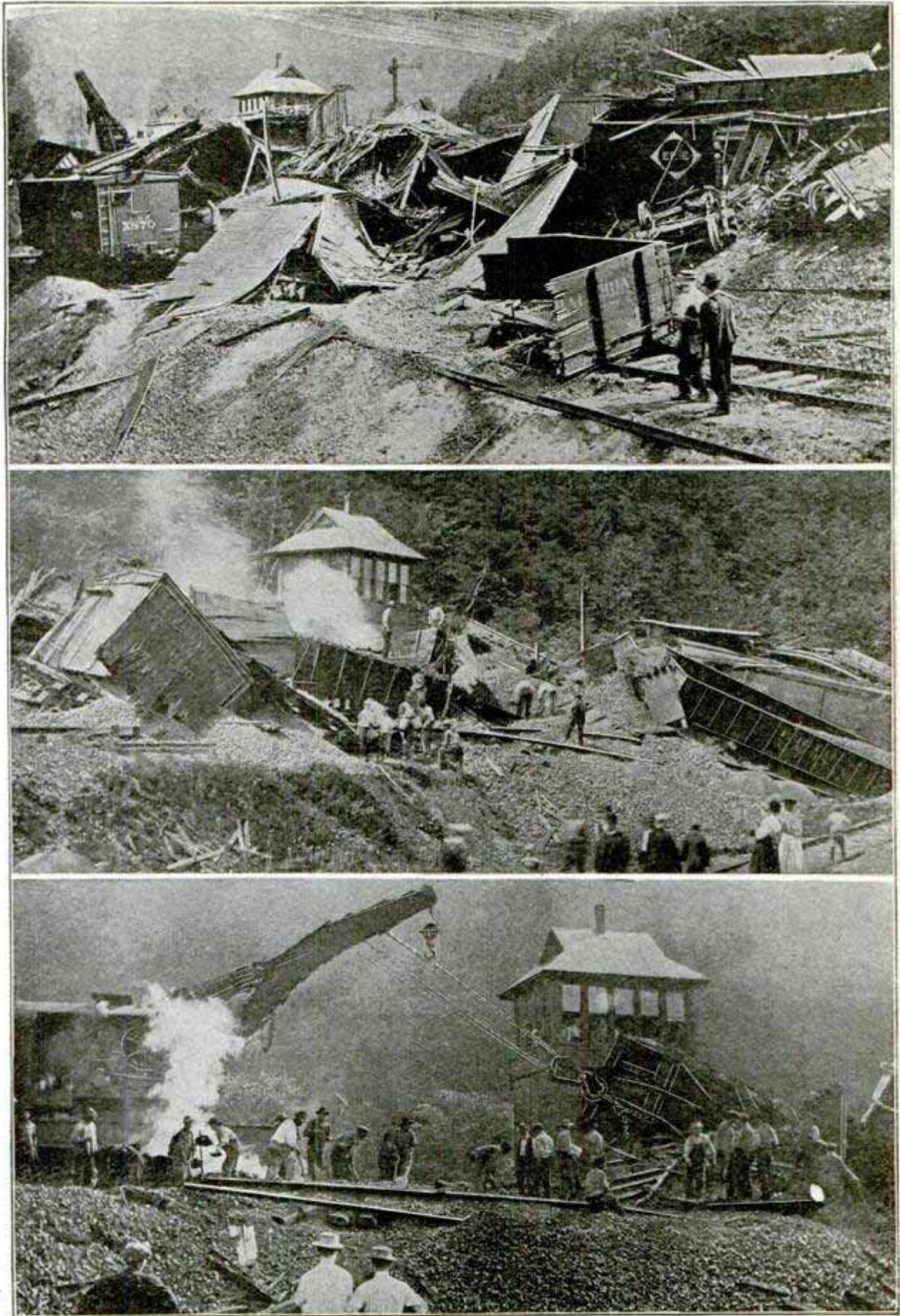
at the Versailles exposition, and spectators claim the elephants actually appear to enjoy the sport.

August broke the 1907 shipping record of the lakes by the movement of 6,806,810 tons. This is at the rate of over 50,000,000 tons for a season of 8 months.

REMARKABLE RAILROAD WRECK

One of the largest and in many respects one of the most miraculous wrecks in the history of modern railroading occurred on the Erie railroad at Jefferson Junction, near Susquehanna, Pa., early on the morning of August 6, 1907. Nine miles up a heavy grade a train consisting of engine, 42 loaded cars and caboose, became unmanageable on account of the air brakes failing to work properly. Notwithstanding the fact that the engineer reversed the engine and did all in his power to stop the train, it rapidly gained headway until it was estimated that it reached the speed of 75 miles per hour when it struck the switches of the interlocking plant at the junction.

The engine passed over safely, but the first car jumped the track, and in the twinkling of an eye the 42 loaded cars and the caboose were a mass of wreckage as shown in the illustrations. The engineer and fireman escaped without a scratch and the engine was not badly injured, the greatest injury being to the tires, which were run off on account of the great heat generated from the friction of the heavy engine sliding for nine miles over the rails. The head brakeman was slightly cut and bruised from jumping, otherwise no one was injured. The operator and the tower were unhurt, although the wreckage was piled on every side and a small building near the tower was demolished. Car X870 was filled with sleeping Italians, none of whom were injured. Note how a broken rail near this car went completely through a box



Views Showing Wreck and Wrecking Crew at Work

car and extended nearly 15 ft. into the air. The durability of the modern steel car seen at the left is also well illustrated in one of the pictures.

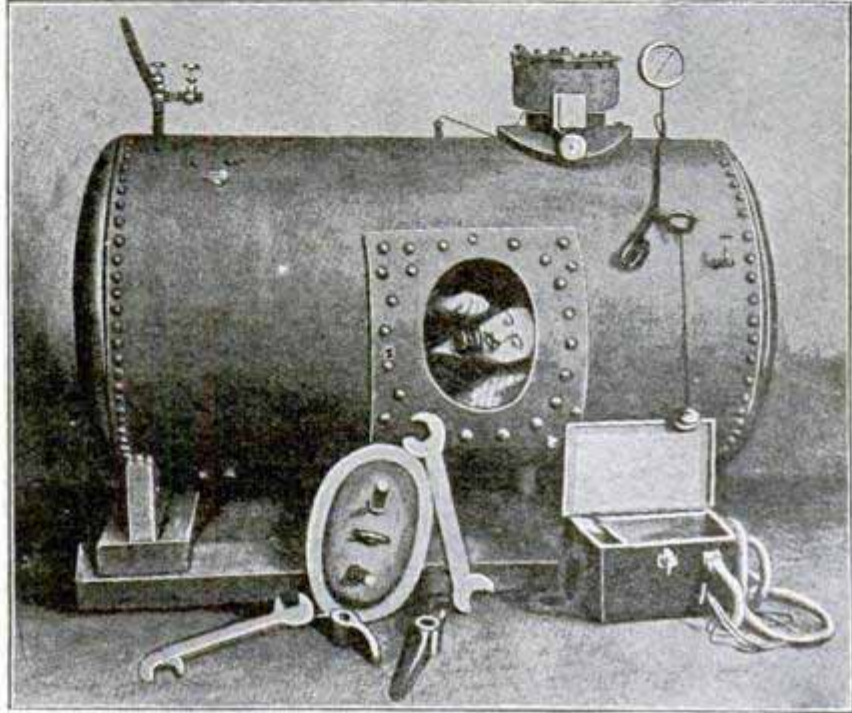
EXPERTS RISK LIVES IN COMPRESSED AIR EXPERIMENTS

Experiments in compressed air made by two English physicians, Leonard Hill and M. W. Greenwood, demonstrated that divers can descend at least 210 ft. under water and possibly 240 ft. without danger of death from the pressure.

For this experiment a specially constructed cylinder of steel was used. Bedding, coverlets and cushions were placed in the interior for comfort, and electric lights and a telephone installed. Besides a unique orifice for compression two loop-holes were provided for de-compression, one showing at the left of the cut. A monometer registered the variations of pressure.

M. W. Greenwood was isolated in the cylinder 3 hours and 11 minutes. At the end of the first 15 minutes the pressure attained 17 lb.

maximum pressure of 100 lb. was reached, gradually returning to the normal pressure at the end of 2 hours and 17 minutes. Air was forced into the cylinder by a pump capable of raising



Cover Removed Showing Position of Surgeon

In 54 minutes the pressure to 6 atmospheres in 40 min.

BIG BATTERY OF RAMS

The battery of 11 rams shown in the illustration are working at Sunnyside, Wash. The fall is 39 ft. and 5 cu. ft.

per second are used with about 80 per cent efficiency, the discharge water being lifted 147 ft.



This Battery of 11 Rams Raises the Water 147 Ft.

CHAMPIONS PLAY BALL. GAME IN BUSY CITY STREET

Electric Reproduction of Actual Game Played Miles Away

A baseball signal board that is the nearest approach yet devised to a substitution for the actual game on the field has caught the town in which one of the near winners of the pennant is playing. Daily in Philadelphia one of the leading thoroughfares is blocked by a yelling crowd that gathers outside the building in which one of the newspapers is housed. The board is so arranged that every play on the field can be seen at a glance. Electric bulbs are lighted to show the position of the batter, the state of the game and the manner of the play recorded.

When the pitcher has the ball ready for play a light in the pitcher's box glows out. If a strike results from the throw another light shows that the batter has connected with the ball. If he reaches his base, the light at that point shows he is safe. If he is thrown out on

the way to first base, another light reveals that to the crowd. If he fails to hit the ball, a light in the catcher's box shows that the man behind the bat has



All the Details of the Game Are Shown as Fast as They Occur



the sphere. If a ball is called by the umpire, a light in the department marked "balls" shows that point in an instant. The batters are numbered opposite their names on a big board below the board proper and the light opposite that number shows who is at the bat. It is by far the most ingenious and simple contrivance for enabling spectators who are unable to see the original game to follow its fortunes at a glance while far away that has ever been devised.

OBSTRUCTING SPEED MANIACS

Wild, reckless driving of automobiles around corners, by speed maniacs, has



Danger Sign in Street

been effectively stopped in Chicago by the erection of danger lights and substantial obstructions (really to protect the light) in the center of the pavement at all intersecting boulevards.

The light, announcing danger through a red globe, is supported on a cast-iron pedestal 14 ft. high. This in turn is supported and "protected" (great emphasis on the protected) by a solid concrete base, 2½ ft. by 5 ft. and rising 1½ ft. above the pavement.

Two lights and obstructions are placed at each intersection.

When the autoist approaches at a rapid clip he sees the gleaming light. He slows up to three or four miles an hour because if he does not he is liable to smash into the concrete obstacle and destroy the light, which action is frowned upon by the municipality, to say nothing of what would happen to the automobile.

POWDER FLASH CURES SNAKE-BITE

While crossing the arid deserts of Nevada some years ago, before Milwaukee's fame had become great enough to keep him home, a now permanent resident of the brewery city, was bitten by a rattle snake and gave up all hope. The guide threw him to the ground, and breaking open a cartridge covered the wound with powder. The powder was touched off, cauterizing the wound effectively. The next morning nothing more serious than a stiff leg resulted.

PROTECTIVE GLOVE FOR X-RAY OPERATORS

The protection of physicians operating the X-rays has become far more important than the protection of patients, the danger to the former being much greater owing to continued exposure to the radiation in treating many cases.

Many methods for protection of the parts of the body radiated upon are now being used, a number of which are effective when great care and attention is shown by the operator. The latest of these protective appliances is a glove consisting of an elastic protective substance.



DUMP WAGON FOR BRICKS

The special dump wagon shown is for hauling and unloading brick. The front wheels carry as much load as the rear wheels, the capacity of the two



Unloads in a Moment

boxes being 1,200 brick. The drop is so small the bricks are not broken when the wagon empties.

◆ ◆ ◆

PORTABLE ELECTRIC ROCK CRUSHER

An electric railway desiring to ballast its tracks with crushed stone in a district where plenty of rock was to be had along the route, rigged a portable crusher. The machine was mounted on a skid and driven with a belt from an old street car motor. Power was secured from the overhead trolley wire. As fast as enough rock was crushed in one place the outfit was moved along.

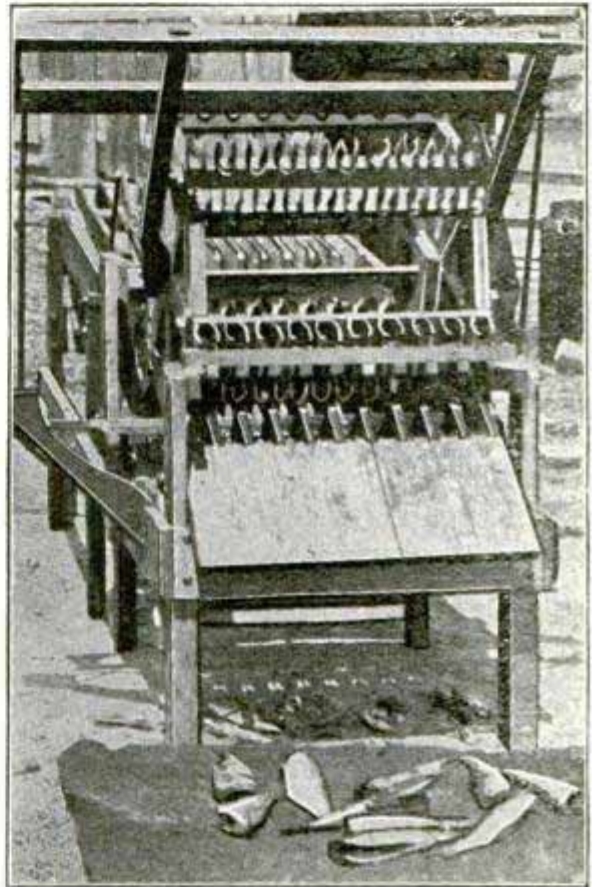


The Electric Crusher

DRESSING FISH BY MACHINERY

The difficult problem of dressing fish by machinery, to save the enormous amount of hand labor necessary at canneries, seems to have been solved at last by the invention of a Pennsylvania man, who has devised a machine which scrapes off the scales, cleans the fish and trims off the heads, tails and fins.

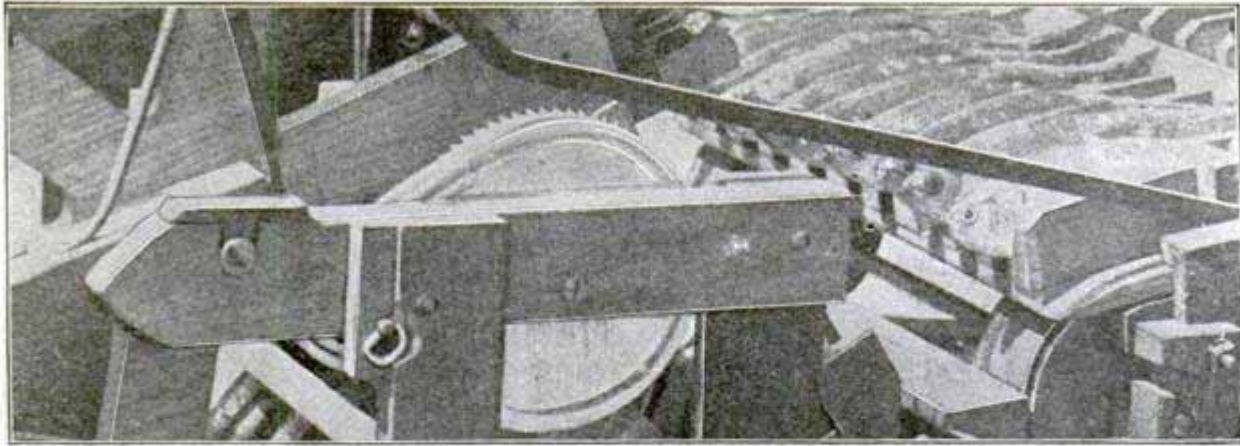
The fresh caught fish are fed into the machine from a table, dropping



Machine Turning Out Dressed Fish

into pockets, which are arranged in sets of ten on an endless belt, the sets so arranged that as one set is filled and moved away another set moves forward to be filled from the table. By the movement of a controlling handle the fish are tightly clamped into the pockets and are brought against a set of knives. These enter back of the gills and pass upward almost through the fish, then turn downward and backward toward the tail, leaving the intestinal cavities open.

With the onward movement the fish come in contact with devices which



Fish Passing Through Machine—300 Per Minute

thoroughly scrape them out, while other knives remove the fins and scales and still others clip off the heads and tails.

The idea for his fish cleaning machine came to the inventor as he stood by the banks of the Chowin river, in Virginia, and watched the comparatively slow work that was being done by the employes of a large fishery in preparing their catch for salting. He claims the machine will completely dress from 200 to 300 fish a minute, depending upon the size.

MAGNETIC PROPERTIES OF STEEL SHIPS

The magnetic character of vessels has been given a comprehensive demonstration at Bremen, Germany. The first observation, taken 10 weeks after the double bottom of a ship had been placed and riveted, showed the polaric power of the vessel to be 25 per cent. A month later the induction had advanced to 34 per cent, and so on until just before launching, a magnetic power of 57 per cent of the horizontal magnetic power of the earth was reached.

When launched the boat was swung into a position nearly opposite to that in which it was built with the result that in a period of 20 days the magnetic power had decreased to 15 per cent. As a consequence the standard compass on the flying bridge went to sea without a compensating magnet, and the steering compass with only one.

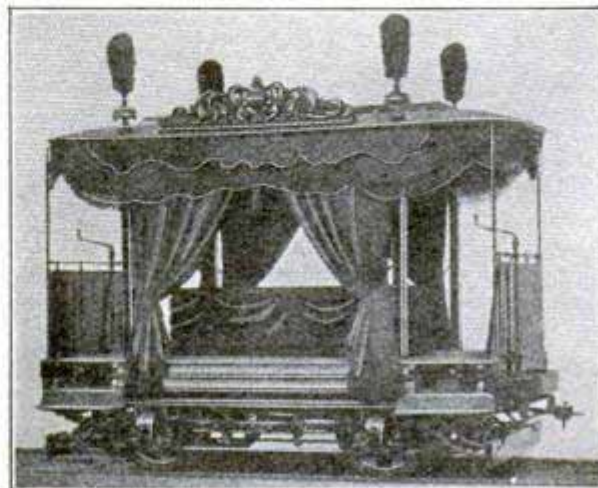
A sister ship after launching was not swung and her head pointed in the

same direction during completion as when building. The result was an increase in the magnetic power to 68 per cent of the earth's power, consequently seven compensating magnets were required to counteract the effect and make the compass point correctly.

FUNERAL CARS IN BRAZIL

Funeral cars of a peculiar design, resembling more a hearse than cars used for the same purpose in this country, are now being used in Bahia, Brazil. The funeral car runs on a track which ends at the cemetery gate. The funeral cortege follows the car bearing the coffin, in other cars of almost the same design, provided with from two to four seats.

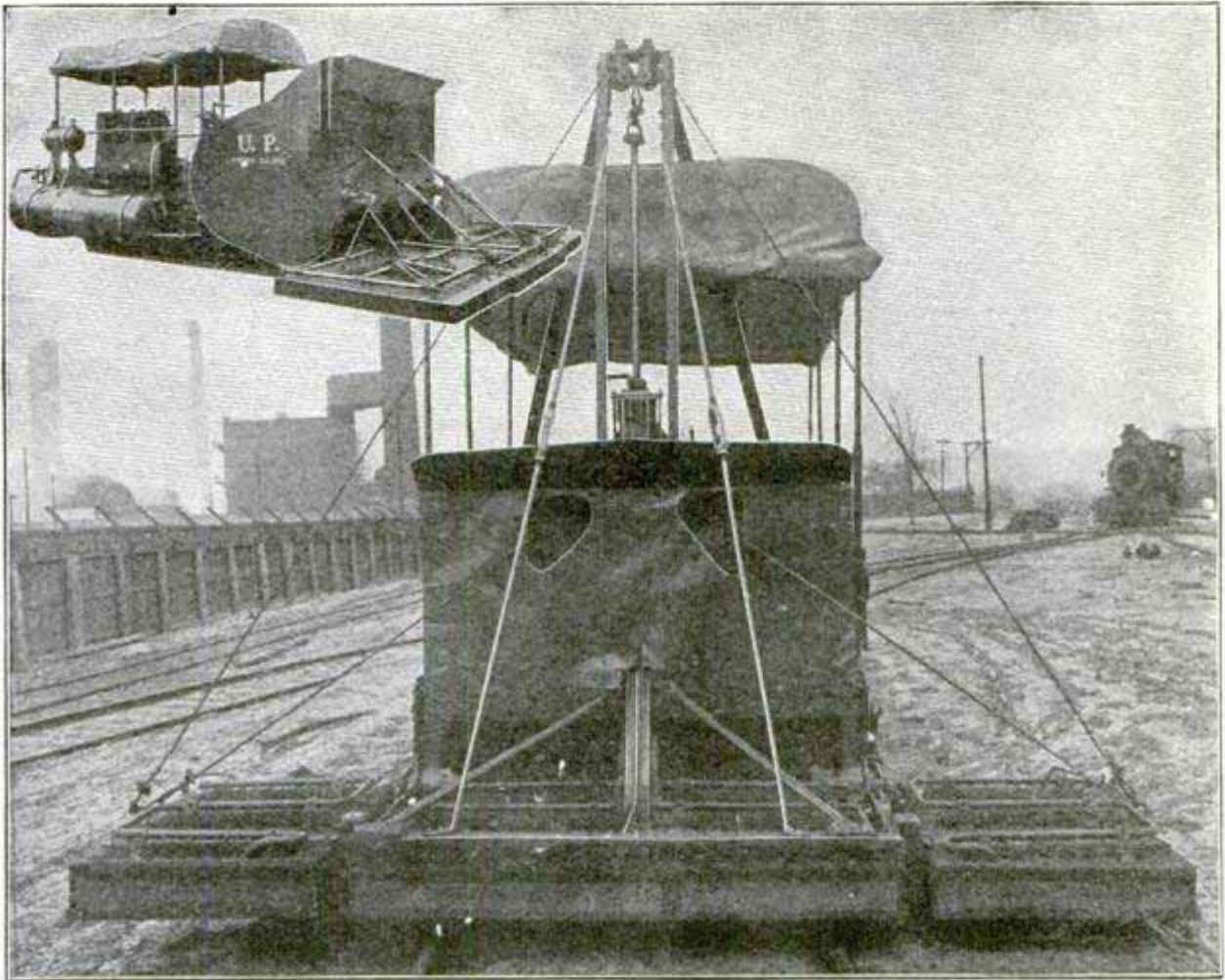
This South American city is separated into two parts, the cemetery lying back of the resident portion on a bluff 140 ft. above the rest of the city.



Street Car Hearse

MAMMOTH GASOLINE WEED BURNER

Thirteen-Ton Machine Does the Work of 300 Men



Burns 4 Miles of Track an Hour

Thousands of men, at a cost to the railroads of hundreds of thousands of dollars, spend the entire summer in a battle with weeds. The main lines, ballasted with gravel, cause less trouble, but along the miles upon miles of branch lines and sidings weeds of every description grow to a height of from 2 to 7 and even 8 ft. Sixteen men, with scythes and hoes by hard work are able to clean up one mile of single track in a day. Notwithstanding the great expense, the weeds must be kept down.

The superintendent of motive power of the Union Pacific railway, W. R. McKeen, has invented a gigantic weed burner weighing 13 tons which moves over the track at 4 miles an hour, bear-

ing a hurricane of flame. When its day's work is done it has accomplished as much as 300 men would have done.

The car is propelled by gas motors, and burns 25 miles of track per day. Gasoline is forced through the burners with compressed air, making an intense heat, which is deflected downward. A strip 12 ft. wide, extending $3\frac{1}{2}$ ft. on either side of the track, is burned over at a cost of \$5.74 per mile, against \$22.40 for hand labor. The approved system is to give the first burning when the growth is 6 or 8 in. high, and after it has dried a few days repeat the treatment, which consumes the weeds and kills the roots. When the burners are not in use the car travels at 16 miles an hour, and at

all times its movements are under orders of the train dispatcher, the same as any train.

PROPER WAY TO HAND TELEPHONE INSTRUMENT TO ANOTHER

In holding a telephone a person naturally takes the transmitter in the right hand and places the receiver to the left ear with the other. In passing the instrument to another person the hands should be crossed as shown in the cut, thus extending the transmitter and receiver to the right and left hands, respectively, and obviating the inconvenience and possible breakage occasioned by the other person's attempt to change from both hands at the same time.



In passing the instrument to another person the hands should be crossed as shown in the cut, thus extending the transmitter and receiver to the right and left hands, respectively, and obviating the inconvenience and possible breakage occasioned by the other person's attempt to change from both hands at the same time.

ating the inconvenience and possible breakage occasioned by the other person's attempt to change from both hands at the same time.

MOVABLE SAND ELEVATOR

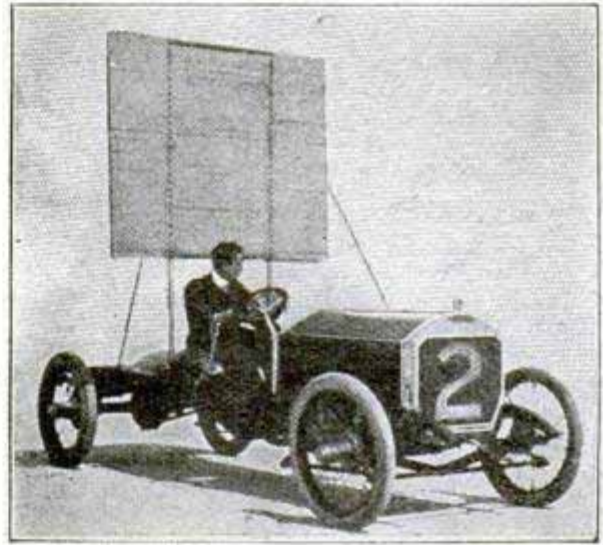
This sand elevator is mounted on four wheels which run on temporary track built along a Rocky Mountain stream. As fast as the available sand is used the elevator is moved to another place.



Sand Elevator on Wheels

HIGH SEATS IMPEDE AUTO

Experiments with wind resistance to determine to what extent the speed of automobiles is retarded by high backed rear seats and limousines are being made in England. A standard car with light two-seater attached was found capable of making 50 miles an hour. A heavy side-entrance phaeton attachment, with hood, brought the speed of the same car down to 35 miles an hour. In many instances a variance of from 5 to 20 miles in speed capacity was shown, according to the resistance of the different attachments. A shallower, but just as comfortable,

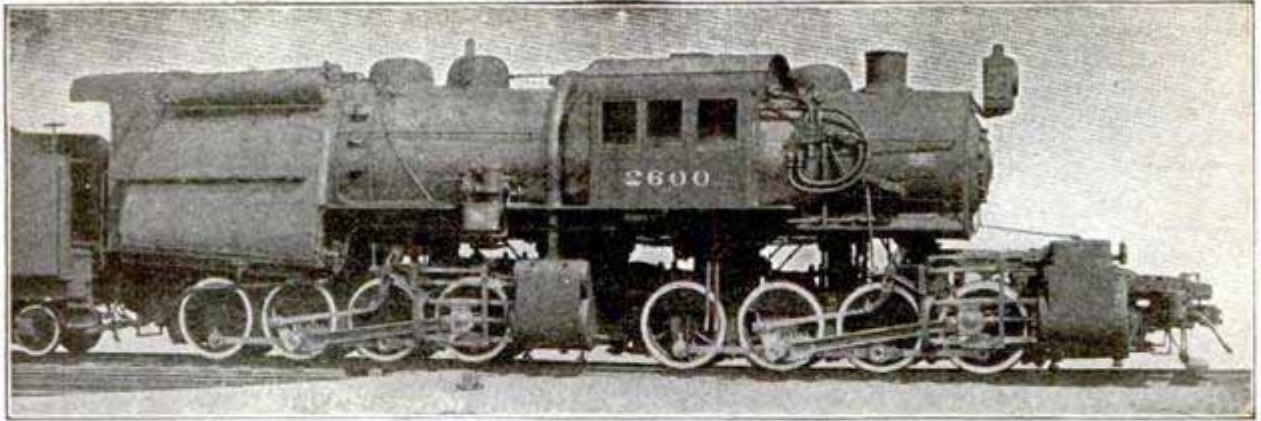


Determining Wind Resistance

rear seat will in many instances make a difference of from 5 to 10 miles in speed. The illustration shows an arrangement, one of many sizes, by which the resistance can be judged.

ARTIFICIAL SUNLIGHT FOR PLANTS

A series of experiments, which if successful will revolutionize the production of fruit and flowers under glass, and enable the gardener to obtain both in a much shorter time, have just been begun in the Royal Botanic Gardens in London, Eng. A powerful arc light, surrounded with water so that the rays may resemble those of the sun, diffuses light over the plants directly the solar light fails.



The greatest locomotive ever built is now completed, and as the picture shows, is anything but attractive. It is a monster, however, and with the tender is nearly 100 ft long. It weighs 205 tons, all of which is carried on the 16 drivers. The 404 boiler tubes weigh 23,700 lb.; the water in the boiler weighs 42,700 lb., and boiler and contents, 139,000 lb. The engine is a compound of four high and four low pressure cylinders and is used as a pusher for freight trains on the heavy grades of the Erie road.

The engine is too powerful to pull a train and will be used exclusively as a pusher.

TROUBLE OF REPAIRING OLD PIANOS GREAT

A long wail of complaint comes from piano manufacturing concerns owing to the time wasted by their workmen in tinkering up old pianos and organs sent by dealers to the factories to be re-constructed. Almost impossible feats of workmanship are at times demanded and in the end owners pay more for repairs on such instruments than they are worth.

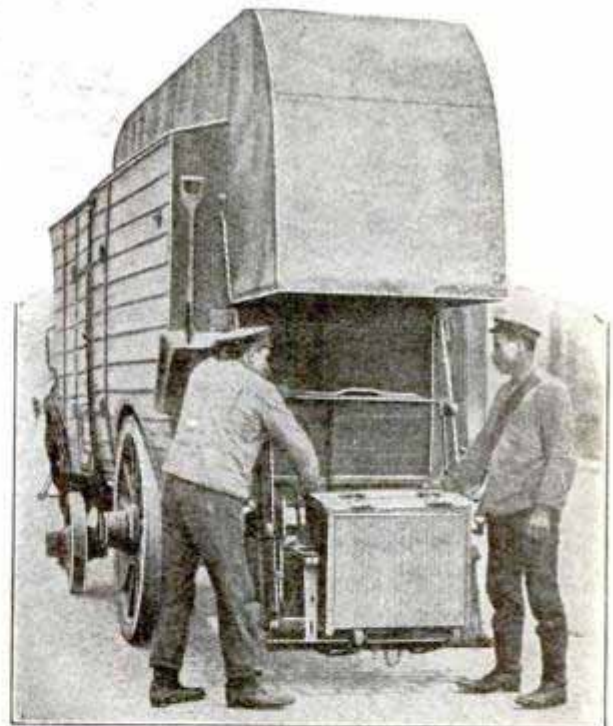
In one instance a piano was sent to a firm with a demand that it be returned good as new and with a new tone, after being stored in the barns of an express company during a severe winter. Exposed to moisture-laden air and below-zero weather, the bass strings have rusted until "dead." It costs more to re-wire an old piano than to wire a new one.

NAUTICAL RULES FOR AUTOS

A bill is to be introduced in the British parliament, applying to automobile traffic the legal obligations now imposed upon shipping, and when a collision occurs the task of proving innocence will rest upon the shoulders of the navigator of the swifter and more easily controlled automobile. The bill also confers power to suspend the licenses of the negligent navigators of the road as is done on the sea.

SANITARY GARBAGE WAGON ELIMINATES ODORS

A sanitary garbage wagon is being used in Berlin and Paris which reduces to a minimum the flying of germ polluted refuse and the odors which especially arise during warm weather



Chute Prevents Escape of Odor

from garbage carried through the streets in the inadequate wagons usually used.

This wagon is completely covered by a large hood of sheet metal, with a sort of chute or funnel, which elon-

gated upon the roof of the hood curves downward at the back end where it is open to receive the refuse. The garbage is placed upon a movable platform under the mouth of the chute and raised by chains into the interior. A trap door opens by the turning of a lever and the box diverts its contents into body of wagon, odor and all.

PROTECTING PILING WITH CEMENT

On the Pacific coast where it is necessary to protect under water piling from the ravages of sea insects the most satisfactory method has been found to cover with cement. To do this sheet iron molds made in two pieces are used, held together by a wedge-shaped clamp; screw clamps would rust. In the illustration the diver is down about 25 ft. He first places the metal molds in position. Having done this he signals to the man shown in the scow to lower a metal bucket filled with concrete. The diver pours the filling into the mold and tamps it firmly. As fast as one section is filled another section of mold is added above the first, and the process continued until the casing is above high tide. After the cement has set the diver removes the molds for use again. This method makes a complete one-piece cement cylinder around the piling.

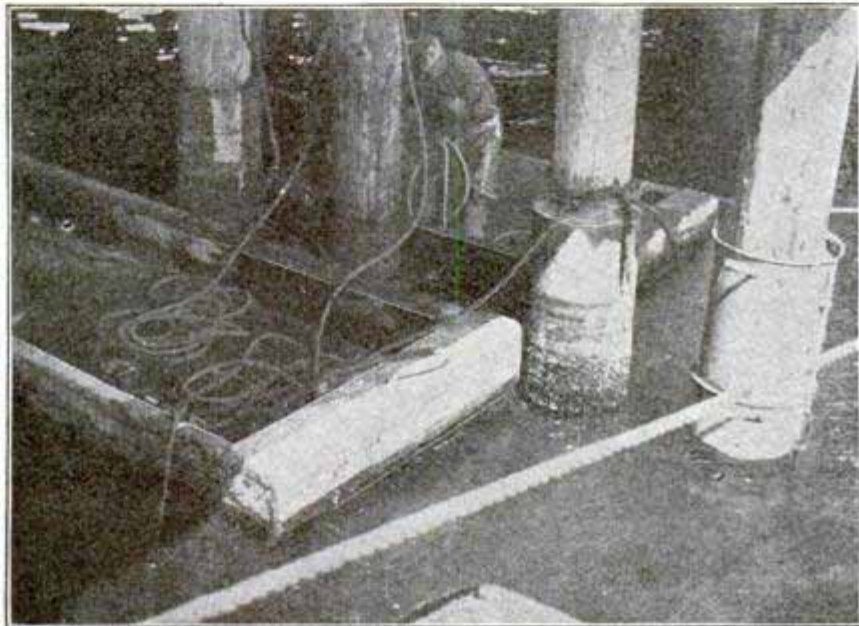
ELECTRIC FANS RESTORE ASPHYXIATED PERSONS

Electric fans as an aid in reviving asphyxiated persons were found greatly beneficial at a recent disastrous fire in which a number of firemen were overcome by gases. Wires were run from offices near the scene of the fire

and attached to fans placed close to the heads of the unconscious men. The rush of air forced into the faces of the men by the fans soon brought them back to consciousness and they returned to continue the fight against the flames.

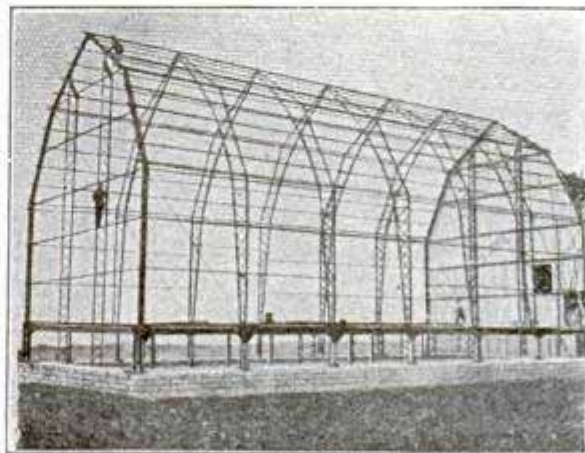
STEEL BARN STRUCTURES

Steel, for the construction of barns is coming into general use in many parts of the country. The absence of



Lowering Cement to the Diver

beams and posts gives the entire space of the buildings for storage, and by a movable carrier track loads can be dropped at any place without forking or handling, requiring no help in the barn while unloading. Danger of



Steel Frames for Barns

fire is materially lessened. The rapid advance in the price of lumber makes these structures only a little more expensive than timber.

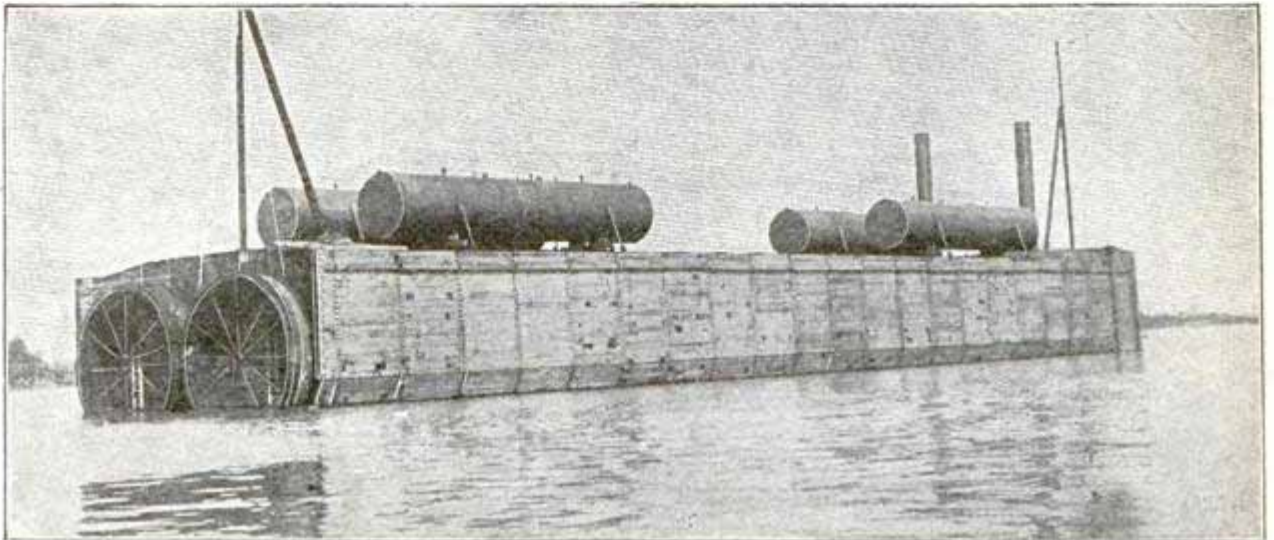
WATER TROUGH COSTS \$250

After paying for several watering troughs in front of his store, which were smashed when heavily loaded wagons ran into them, the proprietor

FLOATING MAMMOTH TUNNEL

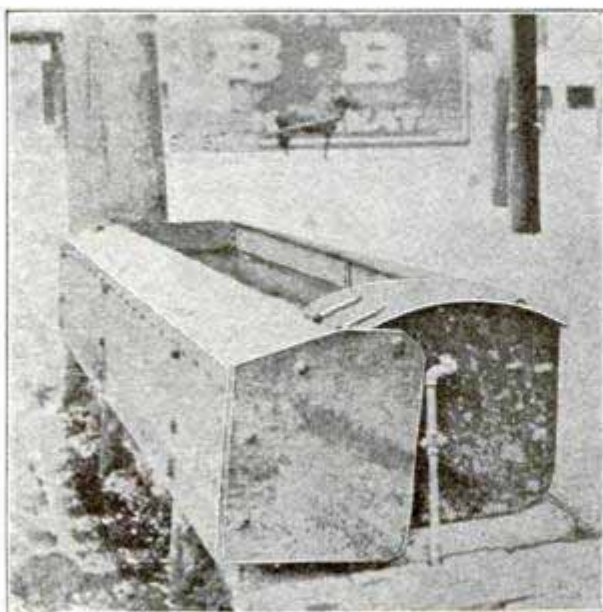
Air Cylinders to Regulate Placing of Tubes—Disastrous Cave-In

One of the twin-tube sections for the Michigan Central tunnel under the Detroit river at Detroit, the tubing of which is being constructed on shore, has been completed and launched transversely, floated down the St. Clair river and through Lake St. Clair to the



Floating the 300-Ft. Section of Double Tunnel

gave orders to build one which could not be broken. The illustration shows what he got, but it cost him \$250. The trough is built of $\frac{3}{8}$ -in. steel plate; at one end an iron box protects the water meter. On the street side three

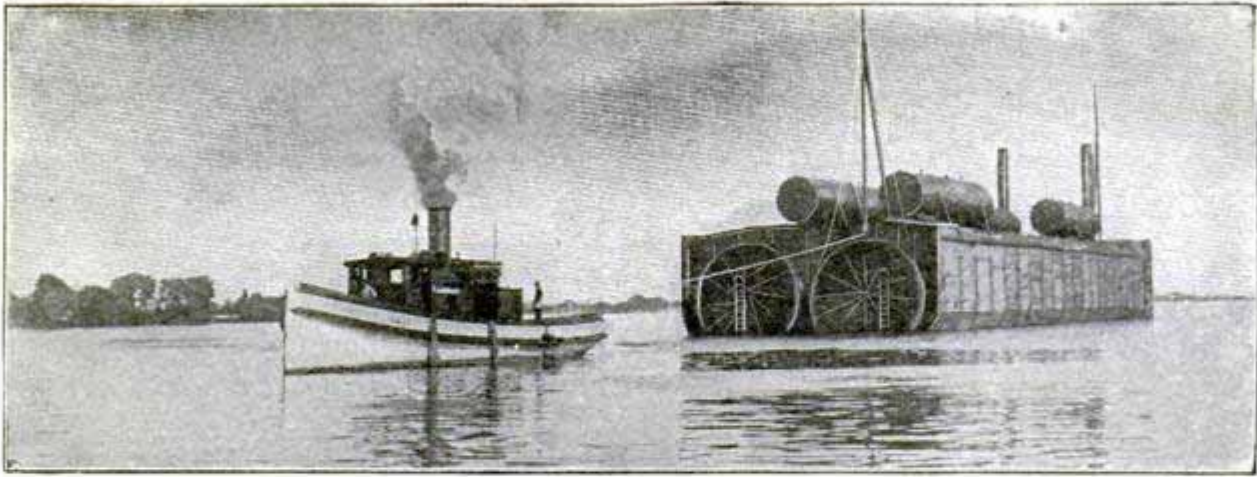


iron posts of 4-in. pipe support an apron of $\frac{1}{2}$ -in. boiler plate.

trenches excavated at the bottom of the Detroit river.

Two steel cylinders, 60 ft. long and 10 ft. in diameter, secured by chains to the diaphragm, act as air chambers, so arranged that they can be easily adjusted in any position along the tubes. When the valves in the bulkheads of the tubes are opened to admit sufficient water to sink them beneath the surface, the upper cylinders, above mentioned and shown in the illustrations, are placed in the proper position to maintain the tubes on a horizontal plane as they are gradually submerged.

The cylinders are provided with a compressed air mechanism, and valves making possible their partial submergence or elevation, as the circumstances of the moment may demand. In this way the engineers have complete control of the entire structure, as the tunnel tubes cannot sink except as the buoyancy of the air chambers is overcome by the weight of water admitted.



The Floating Tunnels Were Towed by One Tug

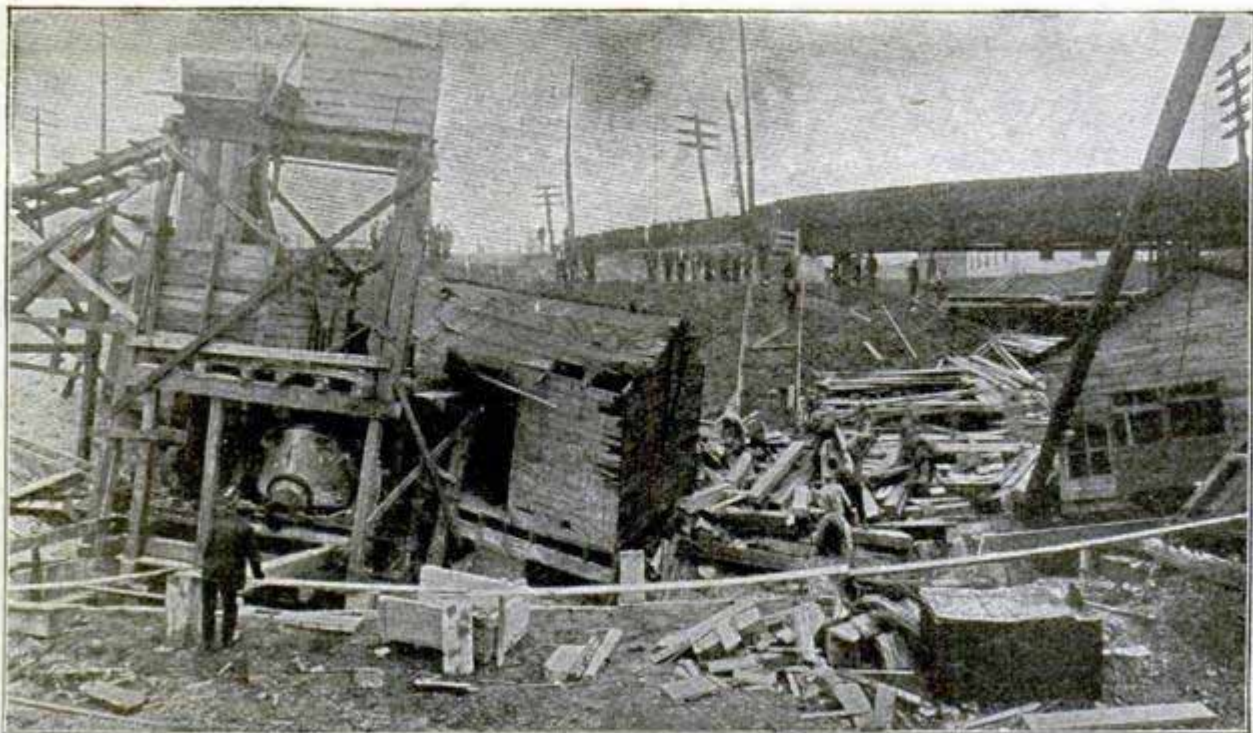
Only one accident has so far marred the work. Shaft No. 1, was almost completely wrecked and a dozen workmen narrowly escaped being buried beneath tons of debris as the result of a disastrous cave-in a few weeks ago, caused by the tremendous pressure of the embankment above. A wall 40 ft. below the surface collapsed like paper and the tunnel cut proper, a drift 8 ft. by 15 ft., was filled for 50 ft. from the shaft island.

As a result of recent accidents to various navies the British warships will have their magazines cooled with refrigerating machinery.

WIRELESS 'PHONES FOR ATLANTIC SQUADRON

Through a wireless telephone system being installed on the ships of the Atlantic Squadron, Admiral (Fighting Bob) Evans will be able to talk with the officers of his battleships five miles apart. This, too, without shocking the ears of telephone girls when a hot engagement is progressing.

Details of the invention are kept secret by the department because of an unwillingness to inform foreign powers of their nature. The "Louisiana" and "Virginia" have been thus equipped for some time with satisfactory results.



Tunnel Cave-In at Shaft No. 1

UNIQUE FEAT IN BRIDGE BUILDING

In order to give necessary space for the construction of a new bascule bridge across the north branch of the Chicago river immediately alongside the old swing bridge, and yet allow the old bridge to be swung for the passage of boats, is the problem which confronted and was successfully solved by the engineers of the Chicago & Northwestern railroad.

To make this problem possible a portion of the east arm of the swing bridge was cut away and a temporary trestle built to take its place. One hundred and sixty-five tons of pig iron, placed in strong wooden boxes, securely bolted together and supported on transverse struts resting on the top chords, were used as a counterweight for the west arm, left intact. The counterweight required was accurately calculated by an arrangement of electric contact points on the extreme west end, so that, at the first tendency of the counterweight to lift this end, the contact was broken and a signal given by an electric bell.

The work was commenced and completed on a Sunday, traffic being the least heavy on that day. At 9:40 a. m. the last train passed over the bridge and a gang of 150 mechanics com-

menced work. At 5:30, after a blockade of only 8 hours, work was completed and traffic resumed.

AUTOMOBILE SCISSORS GRINDER

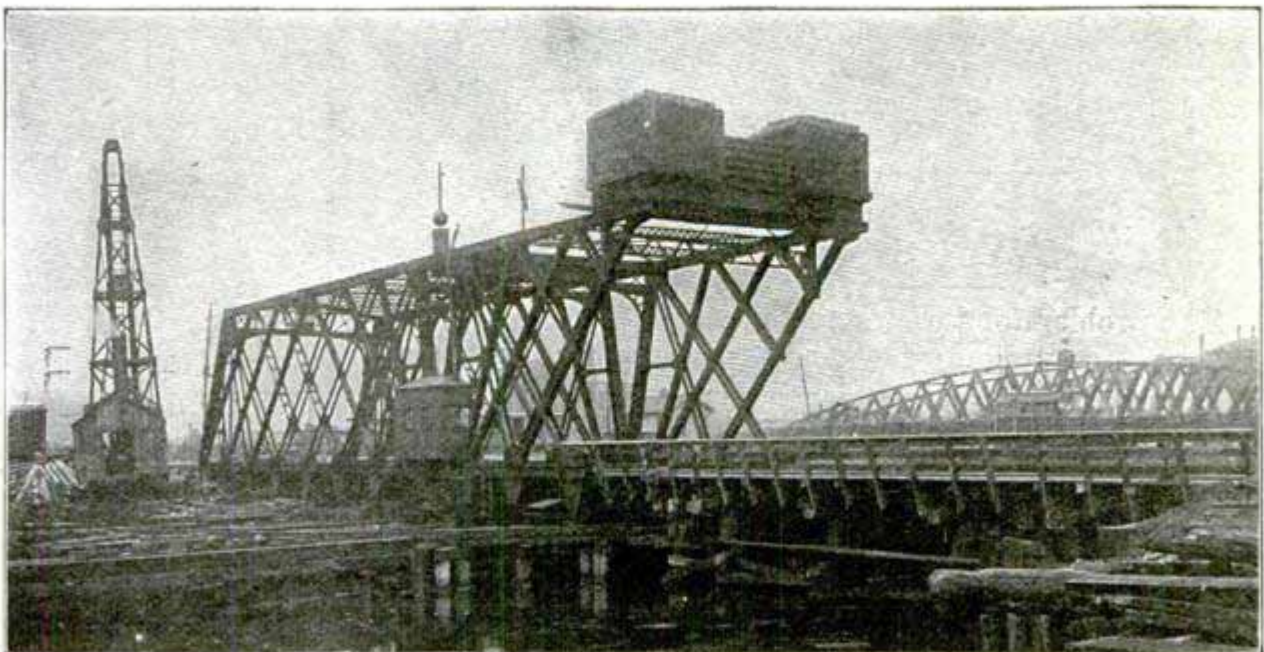
These are certainly progressive times when the formerly humble oc-



An Aristocrat

cupation of scissors grinder is raised to the dignity of automobilist.

An enterprising citizen of Los Angeles who conceived the idea of covering the entire city every day by



Nearly Half This Bridge Was Cut Off

means of an auto, bought a machine and rigged up connection for driving his grinding wheels with power from the engine. His regular customers include butcher shops and restaurants, which are served at the same hour each day; in the afternoon he visits the residence streets. The time formerly spent in walking from place to place is now profitably employed in actual money earning work. His expense for gasoline is about 25 cents a day.

BRACE FOR CONCRETE BRIDGE

This concrete bridge is a failure partly because the arch was too flat and on account of the jar of the heavy trains

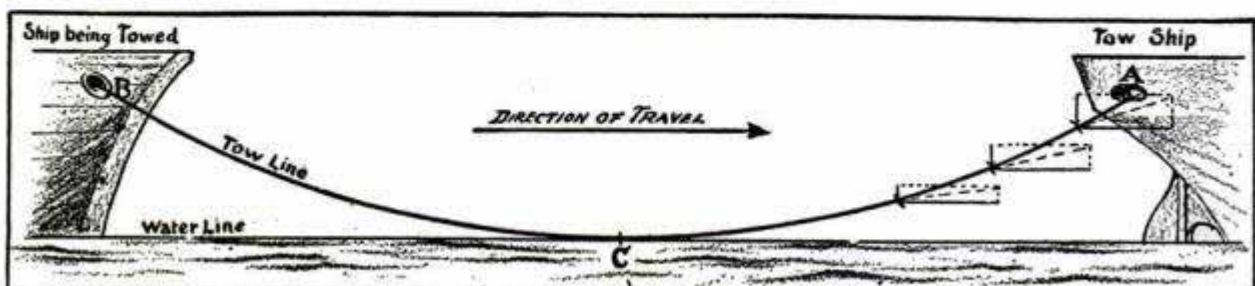


Arch That Failed

which pass under it. The bridge was made of what was considered good material and reinforced with iron, but cracked badly in three places. It was necessary to brace it strongly with supports in order to permit wagons to cross.

BREAKING POINT OF TOW-LINES

The problem of just where the greatest strain occurs on a tow-line has been



Strain is Greatest at A and B—Least at C

Courtesy Am. Marine Engineer

determined as follows, and although no special experiments have been made, it is borne out by the fact that a line invariably breaks close to the point of contact.

In a curve made by a tow-line, called a "catenary," the horizontal components of force acting along the entire length of the rope are equal, while the vertical exponents of force, due to the weight of the rope, gradually diminish where the rope sags the lowest. The direct causes of a break are stress due to the pull of the towing vessel and the resistance of the ship being towed; stress due to the weight of the rope, and stress due to swaying and vibration.

When the tow-line is attached at the same height to both vessels the greatest stress occurs close to this point on each. Otherwise the stress caused by the vibration and swaying of the rope, acting at the center in conjunction with the stress due to the pull, will cause the rope to part close to that point of attachment which is the higher of the two.

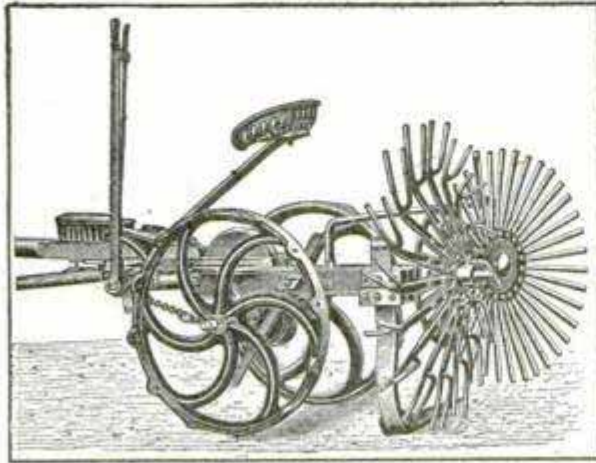
TIDES AT TERMINI PANAMA CANAL

It is interesting to note the difference in the tides of the two oceans at the termini of the Panama Canal. The mean level is the same, but on the Atlantic side the tidal oscillation does not exceed 2 ft., whereas on the Pacific side it is at times as great as 20 ft.; 10 ft. above and 10 ft. below the mean level.

The public schools of Cleveland may be equipped with book holders, which enable the scholars to sit erect while studying.

POTATO DIGGING MACHINE

This queer looking machine is made in England for use in New Zealand. It is drawn by two horses, the driver rides, and the potatoes are dug and thrown out to one side on the ground.

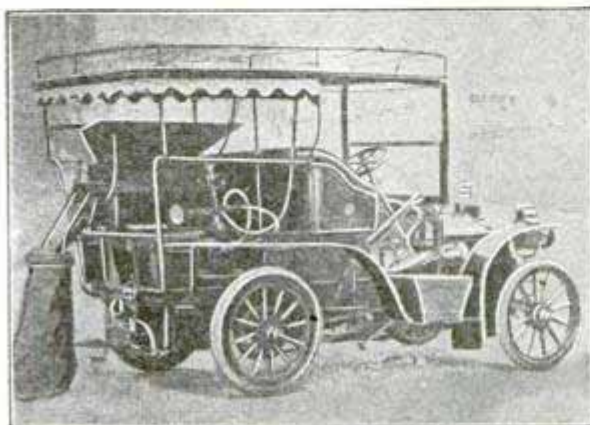


Potato Digger

There are American made machines, however, which not only dig, but shake the dirt from the potatoes, elevate them and drop them into sacks.

AUTOMOBILE MILLING AUXILIARY

An automobile is now being used in England in demonstrating to country millers the process of bleaching. The bleaching machinery, consisting of a generator and agitator, is mounted in the space usually occupied by the tonneau and is operated by the motor which drives the car. An expert representative of the milling company, accompanied by a chauffeur, takes the outfit all through the country side visit-



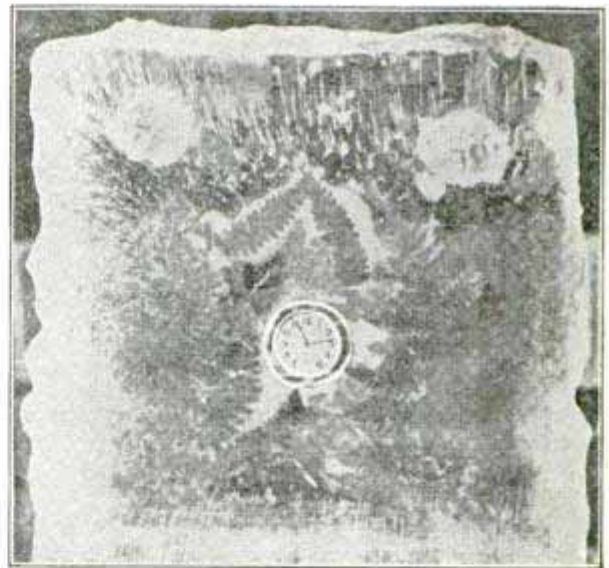
Traveling Millers' School

ing the many milling establishments. The machinery is capable of treating nearly 3 bbl. an hour.

"The venture met with so much success," says The American Miller, "that two similar cars have been ordered. The first car used is now touring France and the two new cars will be used in Great Britain and on the continent."

WATCH TICKS IN A CAKE OF ICE

A watch, frozen into a cake of ice for 48 hours, during which time it recorded accurately the fleeting seconds and minutes, is one of the latest wrinkles in jewelry advertising. In referring to the uniqueness of the advertisement Ice and Refrigeration says that the movement of the watch was first incased in a watertight casing and



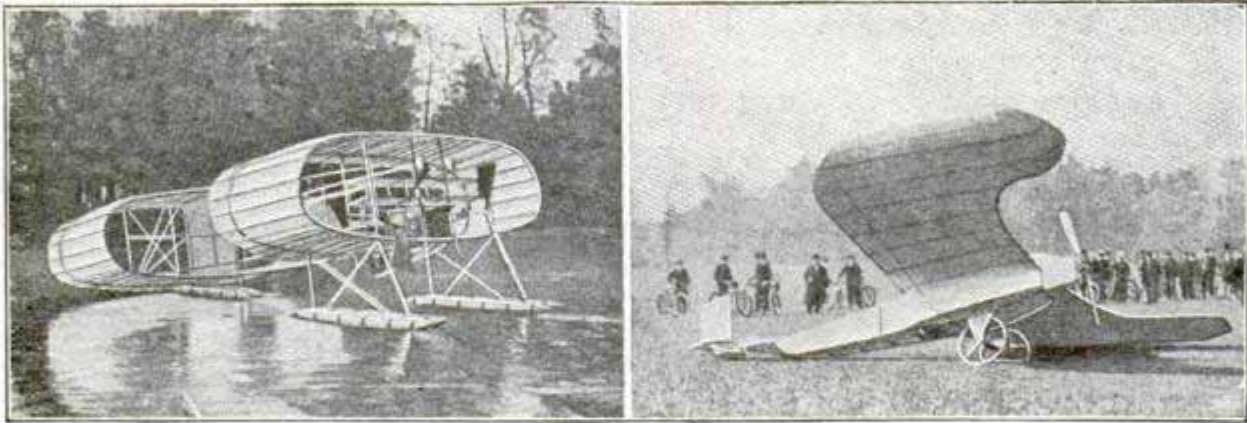
Show Window Novelty

placed in a hole in the cake of ice just large enough to contain the time piece. A piece of mica was then placed back of the watch and water, at a freezing temperature, poured slowly into the hole until it was completely frozen up.

The 50-lb. cake of ice was placed in a show window where the attention of passing pedestrians would be attracted. Around the watch, but further in the rear, flowers and ferns were frozen into the ice in the same manner, making a beautiful floral frieze.

POPULAR MECHANICS

UNIQUE FRENCH AEROPLANES



M. Bleriot's Latest Aeroplanes

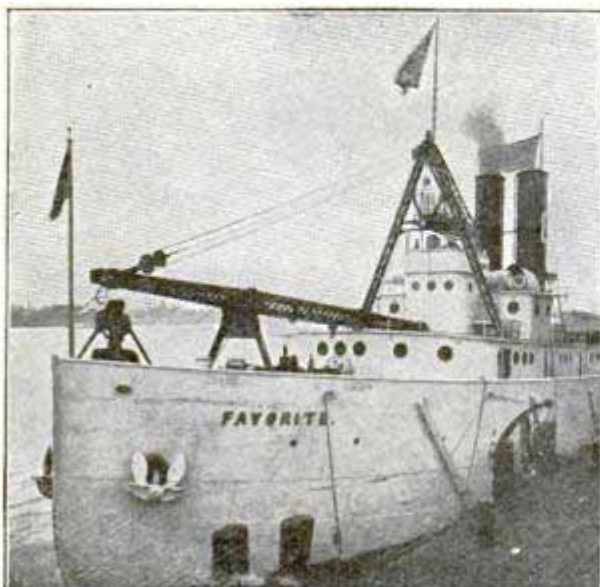
Two unique airships of the aeroplane type have been constructed by a French inventor, M. Bleriot, and tried with more or less success. The first is a cellular aeroplane of which the cells are elliptical. This machine is propelled by light motors of 24 hp. and has been tried a number of times on Lake Engheim. Flight is always commenced from the water.

Another of this inventor's constructions is an aeroplane of the monoplane species, having the form of a bird without a tail, but with a long neck at the end of which the helm is carried. It is believed that this neck, or prow, which carries the aeroplane upright, will prove unstable and trials are soon to be made with the idea of equipping it with a tail.

GIANT WRECKING STEAMER

Carries Complete Machine Shop and Expert Marine Workers

The steel wrecking steamer "Favorite" has just been put in service in the Straits of Mackinaw. She is owned by



Copyrighted by Detroit Pub. Co.

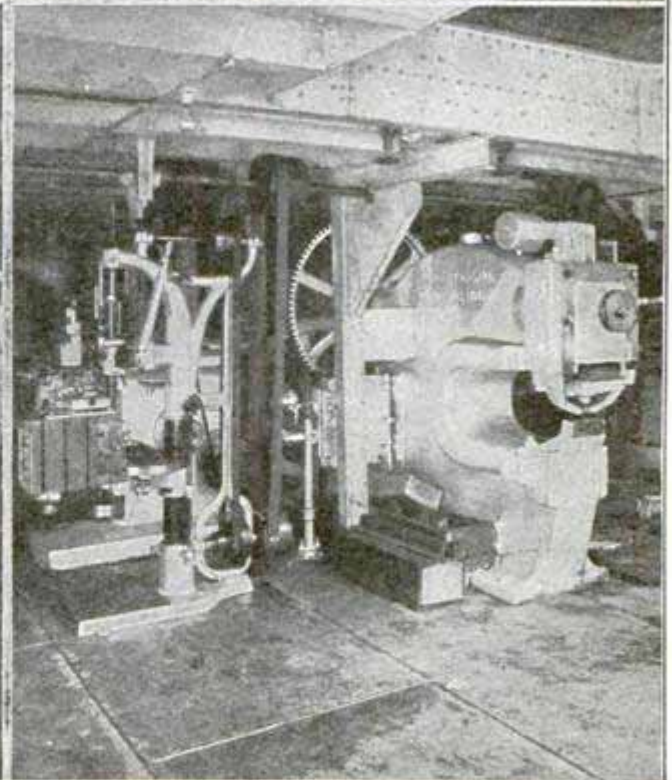
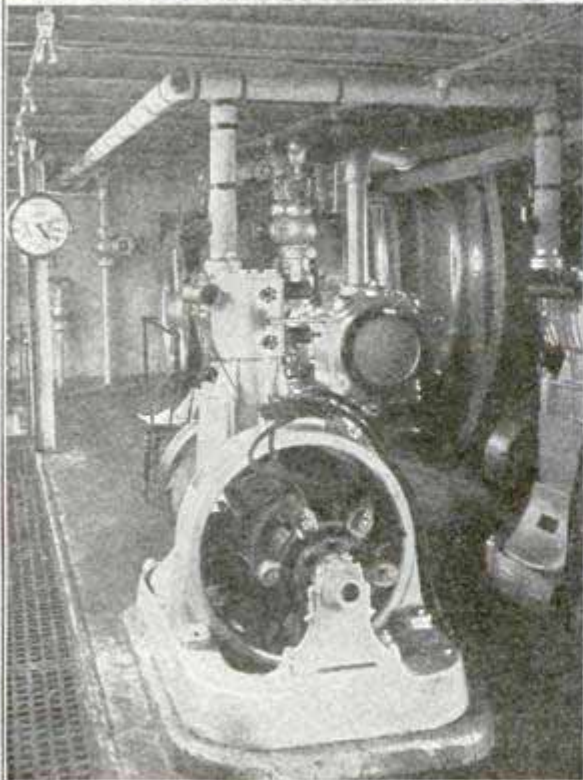
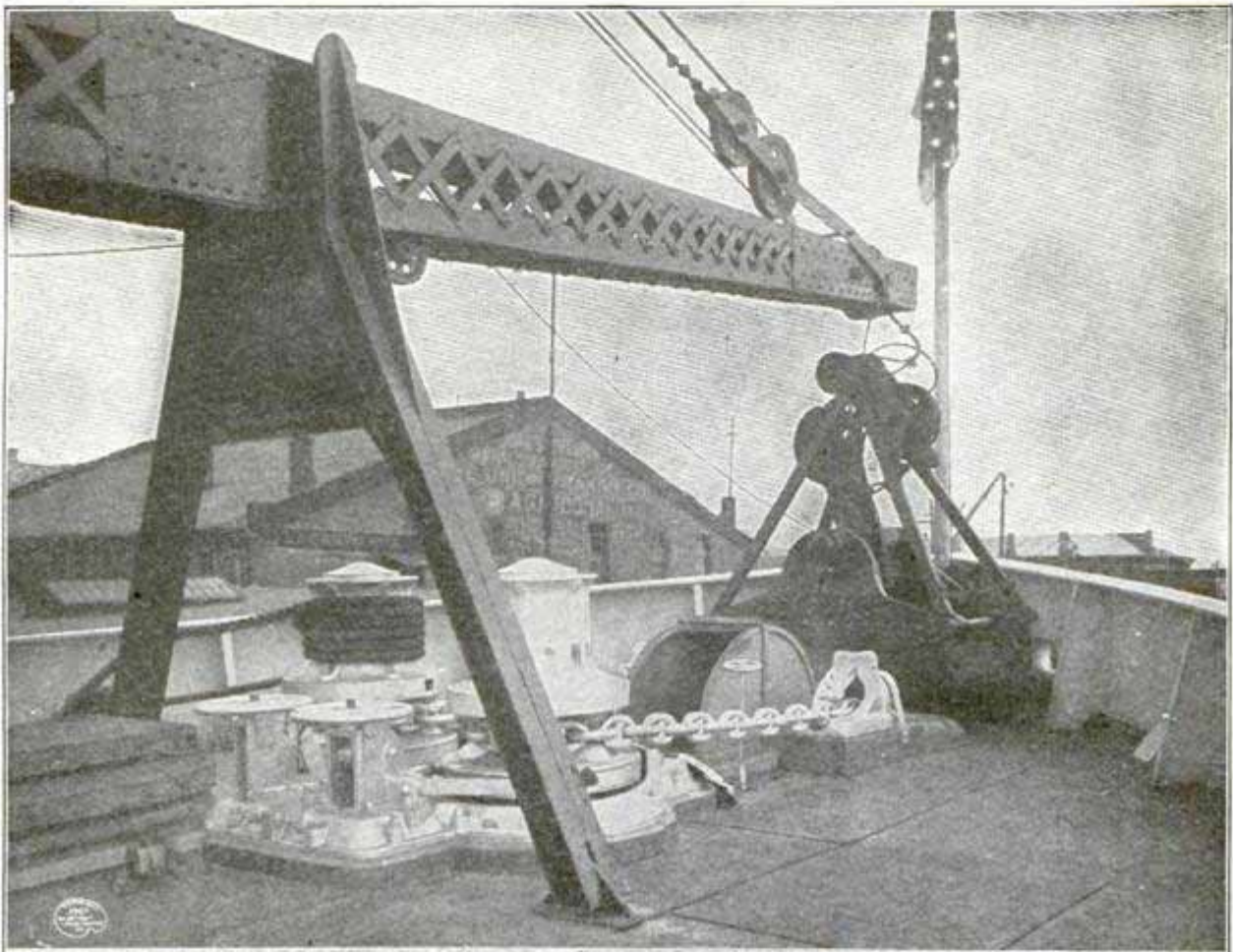
Steam Up—Ready for Emergencies

the Great Lakes Towing Company and is said to be the most completely equipped wrecker afloat, either on fresh or salt water. The vessel is 196 ft. long and 43 ft. wide. When lying at her dock steam is constantly kept up, ready to leave on a moment's notice; long-distance telephone lines are run into the captain's cabin. Every man on board is an expert in his line, and among them can be found one or more competent to make any repair to a vessel that may be needed—divers, electricians, ship's carpenters, machinists and men skilled in removing every kind of cargo in the shortest possible time.

And to do this work effectively the most improved machinery is installed. A powerful hoisting engine operates a 3-ton grab bucket suspended to an A-frame derrick, located on the forward deck.

An enormous towing machine is placed aft and controls 1,800 ft. of 2-in. steel towing cable. As lumber and steel are essentials in wrecking operations,

the "Favorite" carries 50,000 ft. B. M. of the former and a carload of the latter, consisting of plates, channels and angles. A complete power saw mill han-



Copyrighted by DeWitt & Co., Inc.

View Looking Forward—Electric Generators and Air Compressors—Machine Shop

dles the lumber and a fully equipped machine shop takes care of the steel for making repairs to sunken craft.

Thirty 100-ton hydraulic jacks are among the wrecking apparatus and powerful searchlights and submarine lamps are in the equipment to light up disabled vessels at night time and to enable the divers to work in submerged hulls. Powerful air compressors, electric generators and pumps of enormous capacity are included.

Complete stores of food for the men and fuel for the boat are constantly maintained, and when a call comes in the wrecker casts off and is under way with the same promptness with which a fire department on shore responds to an alarm.

GENERAL TROLLEY EXPRESS SERVICE

Arrangements are being perfected to inaugurate a general express system for operation on all electric lines. The service has already been started at Springfield, Mass., and will be extended all over the country as it develops. The method of operation will follow that of the big express companies. Separate express and freight stations will be established on all lines and cars of the usual type will be used for interurban express and baggage service. It is be-

lieved that the placing of the present rudimentary merchandise traffic of the different roads under one head will mark a period of greater efficiency and economy.

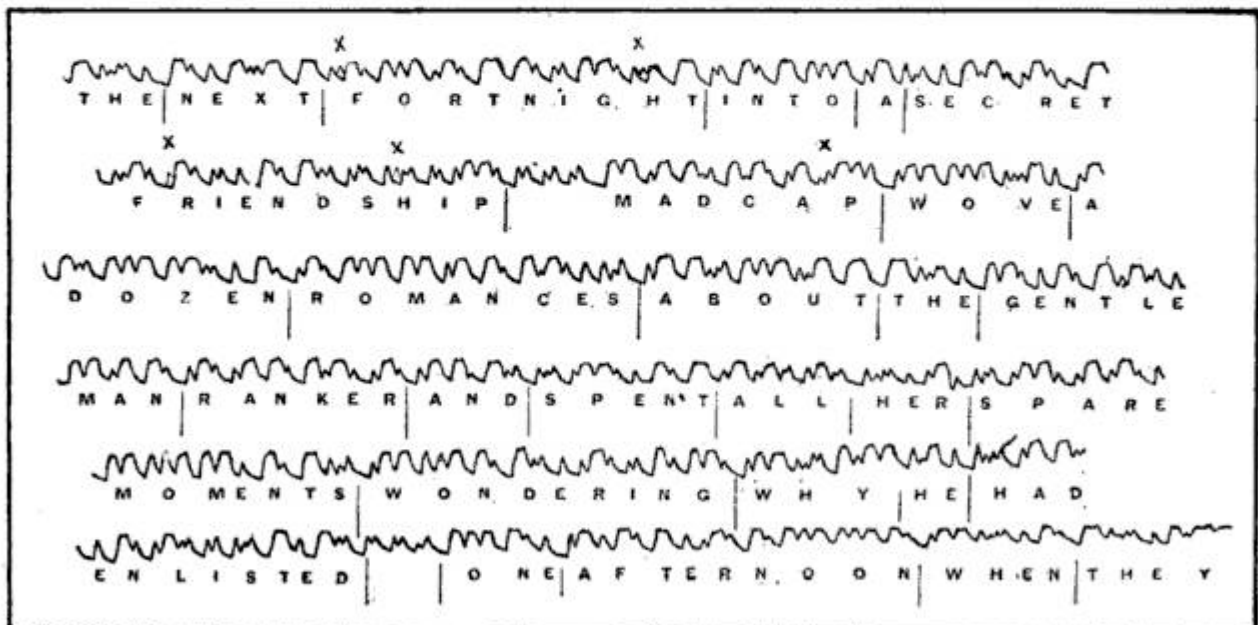
EXPERIMENTS IN HIGH-SPEED WIRELESS

The British postoffice department is carrying on preliminary experiments between two of its stations 15 miles apart for the purpose of developing high-speed work in wireless telegraphy.

In these experiments the received oscillations actuate a wireless receiver, which, in turn, acts on a syphon recorder, causing the Morse signals to be written in a continuous wavy line. The accompanying illustration is a reproduction of the actual received signals at a speed of 35 words a minute. The signaling was done as fast as the operator could send by hand. The speed was so rapid that he occasionally missed dots and shortened his spacing, as can be seen in the illustration.

"The results obtained indicate that Wheatstone working is a practical possibility," says the London Electrical Review.

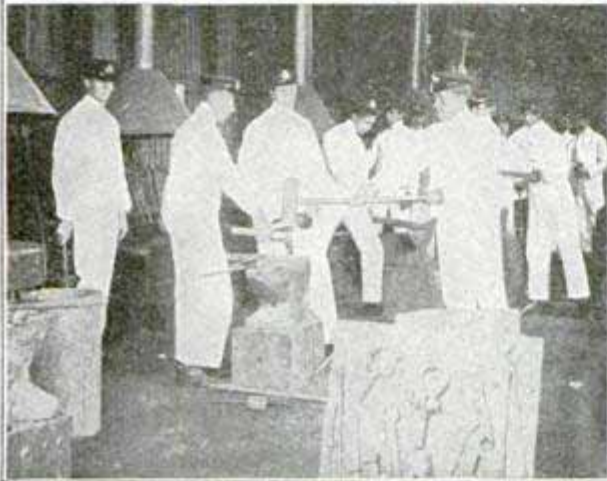
In other experiments the Wheatstone transmitter, which makes and breaks contacts in the primary circuit of the spark coil, is being used.



Wireless Message at 35 Words Per Minute and Translation

YOUNG MECHANICS IN THE CHILEAN ARMY

By Lewis R. Freeman



Squad Drilling

Blacksmith Shop

Mess Room

In the Foundry

There is a too prevalent tendency in the United States to rate everything connected with any of the South American republics—and particularly their naval and military institutions—as very rudimentary or hopelessly antiquated. As a matter of fact the general standard of civilization in Argentina and Chile is little lower than our own, and their military organizations, far from being the picturesque ruffraff of cartoon and comic opera, will compare favorably on the score of personnel and efficiency with those of any country in the world.

For 20 years the Chilean army has been under the personal direction of a German, General Körner, and in every branch is observable that Teutonic thoroughness which characterizes its European prototype. In no de-

partment is this more marked than in the engineering corps, for which the courses of theoretical and practical training comprise all the latest features of those of similar schools in the United States and Europe. Some idea of the excellence of the scientific and manual training departments may be gained from the accompanying photographs.

NEW HOT-AIR FRUIT-DRYING PROCESS

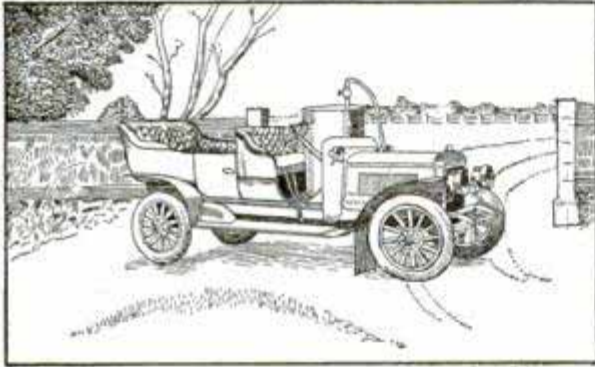
An invention which produces "naturally dried fruit" in an "artificial manner" by a hot air process, has just been tested before experts in California, and proven highly successful.

The fruit is laid in trays, constructed of wire netting, and a continuous draught of air heated to 150° is forced

through the fruit. Moisture extracted is carried away through an air stack and by control of heat and air, nature is closely imitated. The new process is claimed to do the work in two weeks less time than the field drying method and with the same result. The first tray of fruit, which happened to be prunes, taken out of the dryer was acknowledged by the experts to be exceptional. When weighed to ascertain the shrinkage by the new method compared with the old an increase of 10 points was noted in favor of the hot air.

AUTO RUN ON NATURAL GAS

At Medicine Hat, Canada, an ordinary automobile was run on natural gas without altering the machinery. The



Three Miles on Natural Gas

gas was contained in a steel tank 15 by 28 in. and was compressed to 75 lb., making the tank contain about 14 cu. ft. of gas. The gas was controlled by a globe valve and conducted through a rubber tube, one end of which was connected to the carburetor. The engine was started cold and made a run of 3 miles at a speed of about 9 miles an hour, the machine weighing 1,700 lb. It was estimated that about 10 cu. ft. of gas was used in the run.

WHY RIFLED PIPE LINE TRANSMITS FASTER

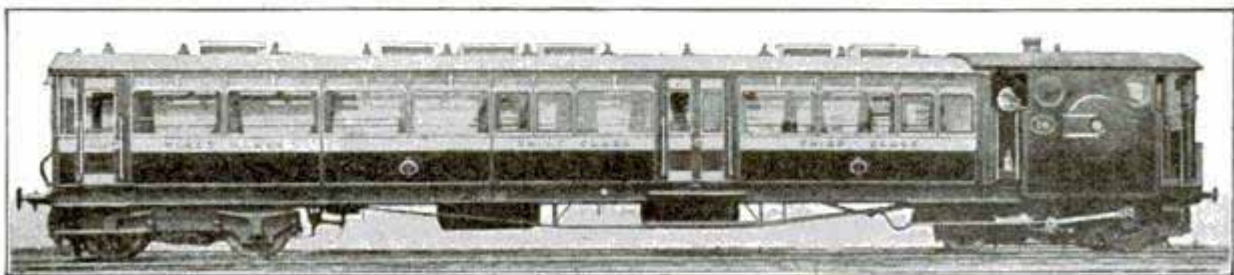
The secret of the more rapid transmission of oil through a pipe line proves to be water. The 256 miles of 8-in. rifled pipe of the Southern Pacific will transmit 23,000 bbl. of fuel oil each 24 hours.

An exhaustive series of experiments has demonstrated that after a small per cent of water has been added to the oil, and the necessary pressure applied, that the whole will develop a whirling motion, and that the water being the heavier will seek the outside of the pipe, thereby enveloping the oil in a thin film or shell of water; this shell or film of water acting as a lubricant between the oil and the pipe, and thereby greatly reducing the friction and allowing the core of oil to glide through the pipe readily.

FALL OF QUEBEC CANTILEVER BRIDGE EXPECTED BY MEN

As an aftermath to the horrible cantilever bridge disaster at Quebec, in which 80 men were killed, comes the report that nearly every man working on the structure knew of the peril three or four days before it occurred, and that a telegram sent by the consulting engineer to his foremen the day before the crash, ordering suspension of work, was delayed until too late.

"My inspector told me two days before the disaster that things did not look well at the bridge and that it ought to be looked into immediately," said the consulting engineer of the bridge company. "I wired my men to



Steam Rail Motor Coach, Toff Vale Railway

get off the bridge and stay off until it had been examined, but the telegram was probably delayed by the telegraphers' strike."

One of the workmen, a structural iron worker, said that for several days rivets had been snapping and that he and 40 companions, believing that the structure was unsafe, quit work two days before the disaster occurred, although the bosses tried to argue them out of their fears.

There were 18,000 tons of steel in position when the structure fell, all of which went down on the rocks or into the river, which is 180 ft. deep.

WHALES STILL HUNTED

But not so much as before mineral oil was adapted to so many uses. This has given the whales a chance to increase and they still furnish a lucrative industry to those who hunt them for their oil, which possesses peculiar advantages for certain uses, and for the rare ambergris, more precious than gold. The latter is a morbid growth in the whale's intestines.

Whale oil is best for tempering because its fire-test is very high. It is used in cotton and woolen mills as a lubricant because it saponifies readily, and because a spot of it on the goods is removed easily without stain; it does not gum, nor become rancid, and heat affects its thickness but slightly.

Though the ancient glory of New Bedford as the headquarters of the whaling industry has departed, it still sends out a fleet of 30 sail and steam craft to fish for leviathan, and there are two others in commission at Provincetown. So far as known, these two ports are now alone in fitting out whalers, San Francisco having gone out of the business. Although the business is not big, according to modern standards, the annual receipts of oil at New Bedford average 12,000 bbl., valued at \$335,000. The bark "Greyhound" recently brought in \$80,000 worth of sperm oil from a four years' cruise off Brazil and Patagonia.

THE ARMY IDENTIFICATION TAG

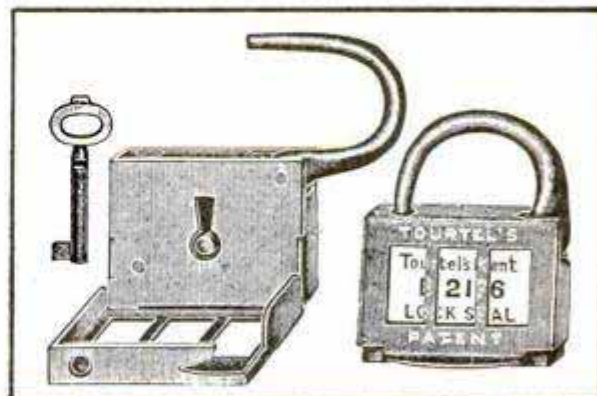
By a recent general order the War Department has directed that in future all men and officers shall wear as a part of their field equipment a small aluminum identification tag, on which will appear the owner's name, rank, company, and regiment.



This little tag, somewhat larger than a silver quarter, is to be worn inside the shirt, suspended from the neck by a cord, and is to be furnished without charge to all enlisted men, and at nominal price to officers. It is strange that so simple a method of identifying killed and wounded soldiers should not have been adopted before this date.

A NEW TYPE OF PADLOCK

The illustrations show a new form of padlock used for meters, scales and articles of a like character. The seal is effected by the printed slip of paper over the keyhole. All locks are opened



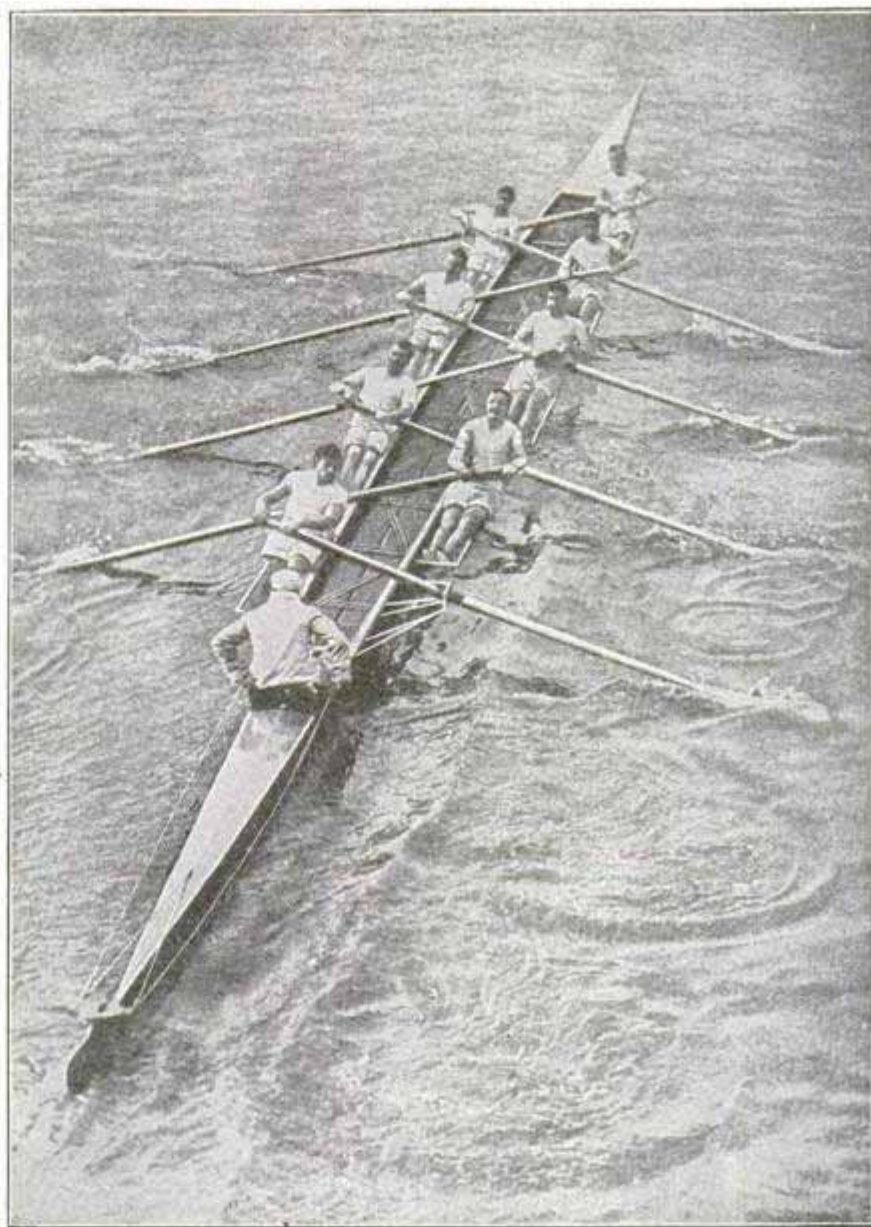
For Sealing Meters

by the same key, and it is said that the numbered slips render it impossible to tamper with the meter without detection.

OUTSIDE SEATS FOR RACING SHELL

A freak eight-oared racing shell with seats for all the oarsmen outside the boat, is suggested by B. A. Jessup, an American champion. He does not claim the boat can be used in any but smooth water. The purpose in placing the seats outside is to secure an additional two feet of leverage in the oar.

Experts are not agreed as to the utility of such an arrangement, and Lehmann, a prominent English sportsman, pronounces it absolutely impossible in real racing.



LIME TO PROTECT OYSTERS

One of the greatest foes to the oyster industry is the starfish, which frequently covers large areas of the sea bottom to a depth of 18 to 20 in., sometimes blanketing entire beds of oysters. The stars are very hard to destroy, but it has been discovered that their steady advance can be checked with lime. The lime is placed in paper bags and dropped along the boundary of the oyster bed. The paper bag causes it to descend through the water, and beyond the lime barrier thus formed not a starfish will pass. A better means for getting the lime to the bottom is being devised.

The first of the two tunnels under East river and connecting New York and Brooklyn is practically completed and will be opened to traffic the first of November.

CONCRETE FOR SMALL CULVERTS

Concrete has a place for itself when used in the construction of small culverts. A prominent railroad system recently built 306 lineal feet of concrete culvert at less than one-third of what cast-iron pipe would have cost.

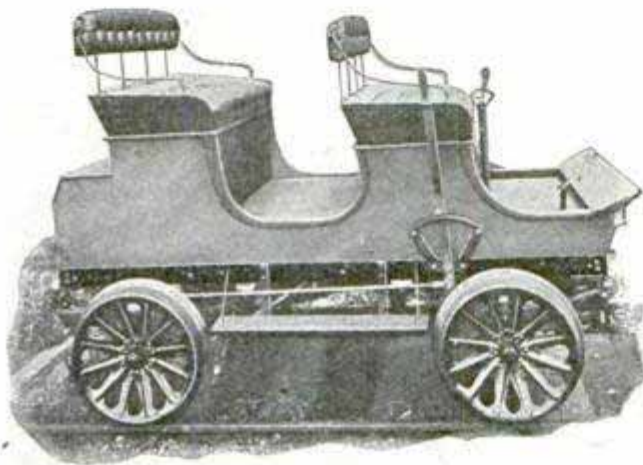
Crushed stone and screenings were used in the mixture and small spandrel walls were built at the ends of each culvert. It was necessary to haul the materials for a distance of a mile. This haulage is included in the cost.

A cast-iron pipe having the same section of water-way as the culvert

would weigh 450 lb. per foot and cost \$9 per foot after being placed in position, making the total cost of pipe \$2,754. The accompanying table shows the cost of the concrete construction per running foot: Labor, \$1.45; stone and screenings, at 50 cents per yd., 25 cents; cement, at \$1.97 per bbl., \$1.01; forms, 4 cents; total, \$2.75.

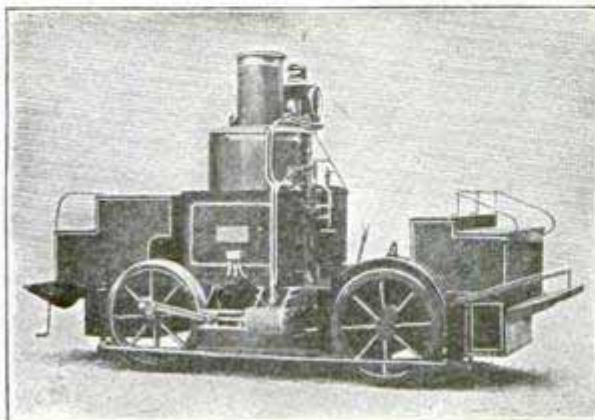
RAILWAY INSPECTION CARS

Small self-propelled inspection cars are rapidly coming into use on all the steam roads. The scarcity of locomo-



American Type

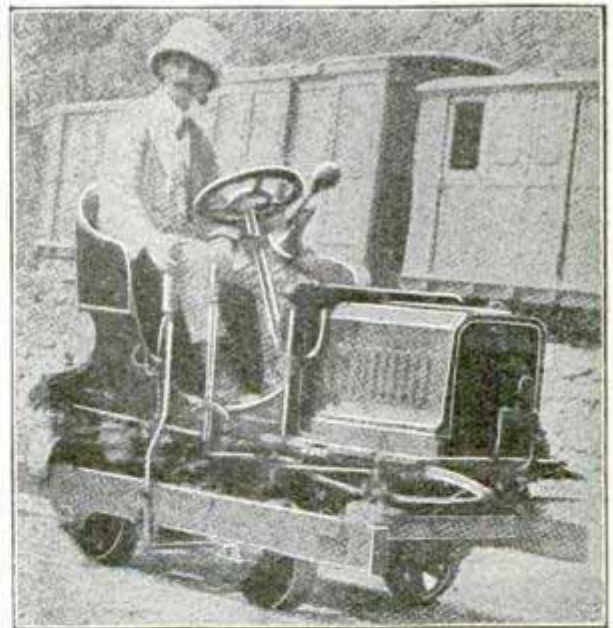
tives to draw special cars has had much to do with this condition, and besides it is much cheaper to run the small motor. Two types of these cars are seen in the accompanying illustrations. The first is an American built car operated with automobile gas engines which develop a speed of 40 miles an hour. The car is built of steel and carries a gasoline supply for 150 miles.



Used in Argentine

The other is an English type, built for use in Argentine, and is a steamer. There is a front seat for two passengers and a rear platform for the engineer, who also does the firing. This machine is also capable of 40 miles an hour.

By a simple contrivance a railroad manager in India has rigged up an automobile so that it can be used on the highway or on rails. The only alteration necessary is the addition of a sprocket on the rear wheels of the truck. Mounted on the axle of these wheels is a drum from which a broad belt is run to a similar drum on the leading wheels. The rail-gauge is only 2 ft. and the entire under-frame fits inside the springs. The manager of the line uses the automobile to run down from Darjeeling to the plains, then the car is lifted off the trucks and placed upon its road wheels. The grade of the Darjeeling railroad varies from 1 in 30 to 1 in 24, and for 40 miles is all uphill in one direction.



Rails or Highway—India

The car makes the grade at an easy 20 miles per hour.

Herr Mauser has invented what he considers an improvement on his well-known rifle by which it reloads itself automatically from a cartridge chamber.

ELEGANCE OF MODERN STEAM-SHIPS

Palatial Quarters and "Marble Halls"

The "Kronprinzessin Cecilie," the new ship of one of the German lines, is a marvel in artistic interior finishing. The dining room has been done in Florentine Renaissance, of a white tone, richly covered with ornaments.



The Dining Room

Sixteen pillars carry a glass-roofed dome. Behind the pillars, the balustrade deck is visible, projecting in the corners in pulpit form. The carved lower balustrade shows two reclining figures in the middle of each of the four sides, containing busts of the crown prince and crown princess and their coat of arms in bronze relief. The sides of the dining room are partly ornamented with paintings of scenes and landscapes around Mecklenburg. The staircase leading to the upper decks is in bronze and wrought iron.

The smoking room is decorated in modern Roman, with a central dome supporting a glass roof. The lower

part is decorated in white, with leather tapestry. The seats are covered with greenish-blue leather. As in the dining room paintings show scenes from the home of the crown princess.

The music room is decorated in the Empire style. The walls are covered with red silk tapestry, and chairs and carpets match the color. A life-sized oil painting of the crown princess looks down from the forward wall.



First Cabin Smoking Room

Reading room, library, and writing room are decorated in white. The furniture is of mahogany, covered with blue gobelin. The children's dining room is covered with blue tapestry, the upper part showing pictures of scenes from childhood life, together with reliefs from well-known fairy tales.

SUCTION DREDGE WORKS CLAY

The contention of dipper dredge builders that suction dredges will not operate successfully in clay is not borne out by Government reports. One engineer in charge of work at Galveston reported moving 218,505 cu. yd. of

mud and clay at a cost of 7.4 cts. per cu. yd. This was done by a suction dredge. Just previous to this a dipper dredge had removed 32,698 yd. of the same material at a cost of 35 cts. per cu. yd.

In 1906 the suction dredge "Caucus" operated in Pensacola harbor for almost a year. During the time 592,018 cu. yd. of coral, sand, and hardened clay were removed at a cost of 6.09 cts. per cu. yd.

It is said when the dredge "C. B. Comstock" is working on a clay bottom and with the pumps running 255 revolutions per minute that the clay comes out in cubes 6 and 8 in. large, and that the spoil bins fill more quickly than when sand is being pumped.

FISH KEPT ALIVE OUT OF WATER

It has remained for the Germans to perfect a scheme whereby live fish may be delivered no matter what the distance from the sea. Dr. Eugene Erlwein is the inventor of an apparatus which keeps them alive when they are out of water.

The fish are placed upon shelves in a case, which has its floor covered with a thick layer of wet cloth. This keeps the air in the receptacle very moist and the gills of the fish never become dry, but move almost as freely as when in the water. Oxygen is first passed through water and then into the case. The fish breathe it through their moist gills as readily as though in water; excess gases escape through a waste pipe.

This treatment apparently in nowise injures the fish, although if again placed in water they appear sluggish for about 10 minutes or until they become reaccustomed to the decreased supply of oxygen.

The case Dr. Erlwein experimented with contained 300 lb. of fish and only weighed 100 lb., which makes only one-fourth dead weight. He has carried his experiments farther and has patented a fish car embodying the principles outlined.

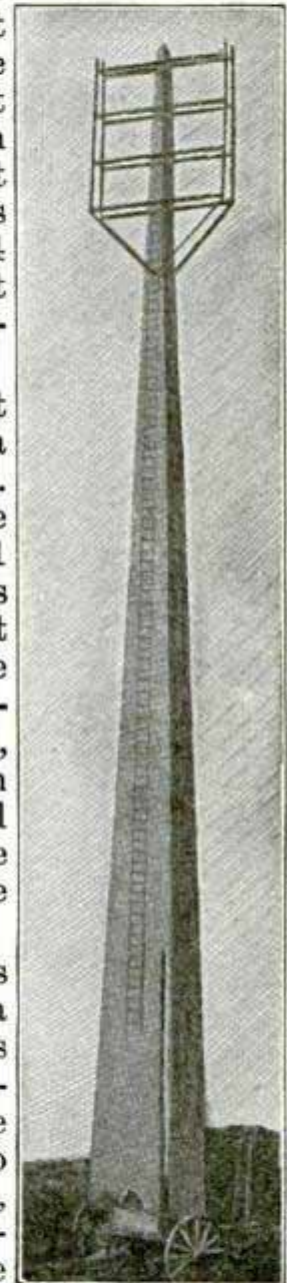
CONCRETE SHAFT 115 FEET HIGH

Largest Construction of the Kind Ever Attempted

An electric company has completed a huge reinforced concrete tower 115 ft. high. It will carry 16 transmission cables across the Monongahela river at Brownsville, Pa. The U. S. government regulations are such that the tower must support the wires across a span 1,014 ft. long, and at least 79 ft. above low-water mark.

The tower is built in the form of a square. It is 8 ft. 2 in. on a side at the base, and tapers to 1 ft. at the top. It is hollow for a height of 84 ft. from the ground, the walls being 1 ft. in thickness, and reinforced with old steel rails and scrap iron. The tower is solid for the remaining 31 ft.

Bed-rock was found at so great a depth that its use as a foundation was impractical. Therefore it was decided to build a concrete base, to carry the enormous weight of the structure. Concrete was reinforced with old rails, laid criss-cross, and made into a block, 30 ft. square and 4 ft. 6 in. deep, at the center, with the top tapering away to 1 ft. 6 in. at the edges. The false work which supported the forms and extended to the top of the tower was 12 ft. square. Fifteen men were occupied on the construction for a period of 25 days.

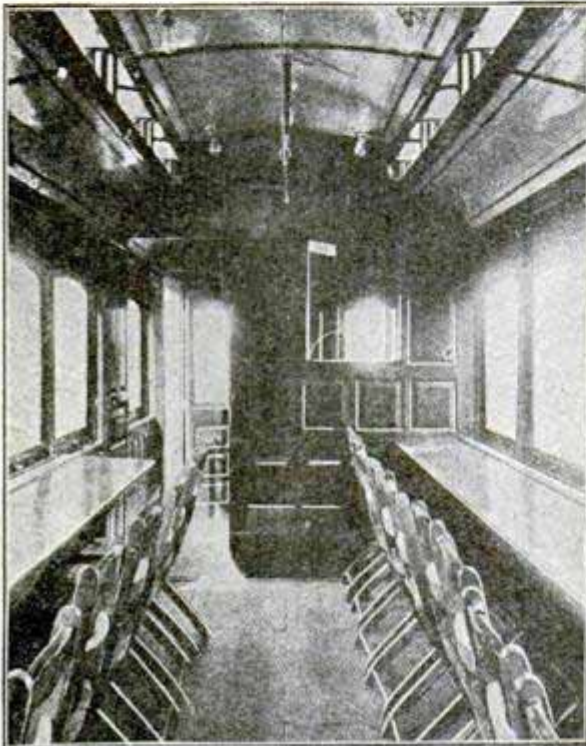


115 Feet High

AN EMPLOYMENT OFFICE THAT COMES TO YOU

One of the latest innovations in electric cars is an employment office car, which goes after the men seeking employment instead of compelling the men to come to it.

This car was placed in operation by



Courtesy Elec. Traction Weekly

The Traveling Office

an electric railroad company in New Jersey, the lines of which are scattered all over the state. On a special schedule card, certain hours of each day are advertised as application days in each of the different cities and towns along the line. Under this scheme the applicants find it as convenient to apply to the company for positions as to any local industry.

The car is so arranged that the superintendent of employment can use the time going to and coming from designated points to do a certain amount of business. The applicant is first weighed and measured on the rear platform and then passes into the first compartment, where he is questioned by the superintendent. If found satisfactory he is passed through to the body of the car, which has a long desk on each side and chairs to accommo-

date 15 men. Here the application blank is filled out and the applicant waits until it is approved and he receives his order to report for duty.

ARCHES OF CONCRETE FOR MINE ROOF SUPPORTS

Arches of concrete to support mine roofs are being used in Pennsylvania collieries as substitutes for timber supports, always breakable, and now very expensive owing to the growing scarcity of timber.

The first of these arches was installed over a year ago. Since then many more have been constructed, none of which have shown the slightest crack or sign of weakness. The concrete forms for the arches were constructed immediately adjacent to the timber sets. After the concrete has set for two weeks the timber supports were removed, leaving the old lagging resting on the concrete. As these rot they will be replaced with old mine rails.

The arches are built 18 in. square in cross section. The first were stiffened by old mine rails. Later steel rope, woven through the concrete, was used. The majority of arches were provided with concrete legs, but several have been built into hitches cut into the top and bottom slate. The estimated cost was \$22 an arch.

FOLDING LAUNCH COVER

The illustration explains the arrangement of the folding cover, which can be opened or closed in three seconds. When not in use it collapses into small space on one side the cockpit.



Closes in Three Seconds

CONCRETE BASE SAVES POLES

A concrete base for telephone poles as a preventive against decay is now being used in some parts of the country. Working on the theory that the poles generally commence to decay first just beneath or on a level with the ground line, the concrete stub or base is placed in the ground. The top of the base rises about 3 in. above the surface of the soil or rock foundation. The pole is placed upon the concrete base and securely fastened with clamping irons and bolts.



In case a pole, already doing service, has decayed near the base, but otherwise is solid, the stub is sawed off at the desired distance from the ground and the pole supported upright while the decayed part is removed and the concrete base substituted.

It is claimed that two men can install a stub an hour in rocky ground. The work of placing the poles requires only two men and a team.

PRESERVATIVE POWERS OF CLAY

Observations on this subject have proved that wood driven or placed in clay is as completely preserved as though immersed in water. Wooden water pipes buried so many years that record of them had been completely lost were dug up in Boston a short time ago and found sound, owing to the dense clay that surrounded them.

In the construction of foundations in the lower parts of New York, stringers and mud sills which had been placed above water level in clay more than 100 years ago, were found in good preservation, while the same material surrounded by other soil had completely rotted away.

AUTOMATIC EXPRESS CALL

An automatic express call for large office buildings has been invented which consists of a distributing box on the first floor, which is connected with every floor in the building by a tube, similar to a mail chute. The distributing box is divided into compartments bearing the names of the express companies and each office in the building is provided with small metal discs, varying in size, on each of which is the



The Disc Drops to Its Box

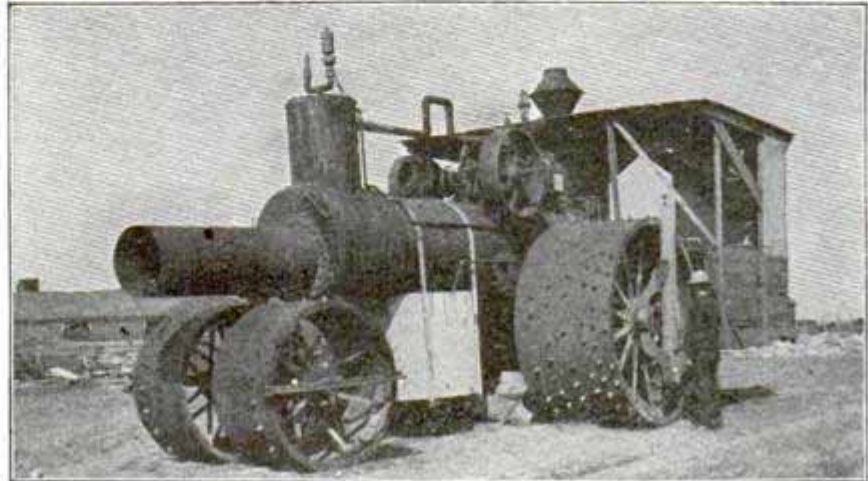
name of an express company represented in the box, and the number of the room.

The person who wishes to send a package selects the disc of the company he desires and places it in the slot of the tube on his floor. The disc drops to the box and slowly rolls over the distributing plate shown in the illustration until it falls into the proper compartment. This makes an electrical contact which automatically displays

the sign of the express company on the outside of the building. The driver, seeing the sign, unlocks the compartment of his company and from the number on the disc knows where to go after the package.

FIGHTING PRAIRIE FIRES WITH STEAM PLOW

Plowing up the sod along railroad tracks has been found to be an effective means for combating prairie fires. This method is now being used on the Canadian Pacific Railway. These fires became so menacing that the officials of the road put their heads together and the result was the odd looking engine shown in the cut. It is used for ploughing the fire-guards along the main line and also for hauling long lines of auxiliary plows rushed to any threatened point.



This Machine Ploughs the Fire-Guards

COUPONS EXCHANGEABLE IN FOREIGN COUNTRIES FOR POSTAGE

Coupons, enabling persons to send return postage to foreign countries, or pay small accounts without the trouble



Exchangeable for Stamp

of procuring money orders, were issued October 1 by the postal departments of the United States and nearly all of the

civilized countries of the world. Hitherto this has been impossible because the stamp of one country is useless on a letter starting its journey from another country.

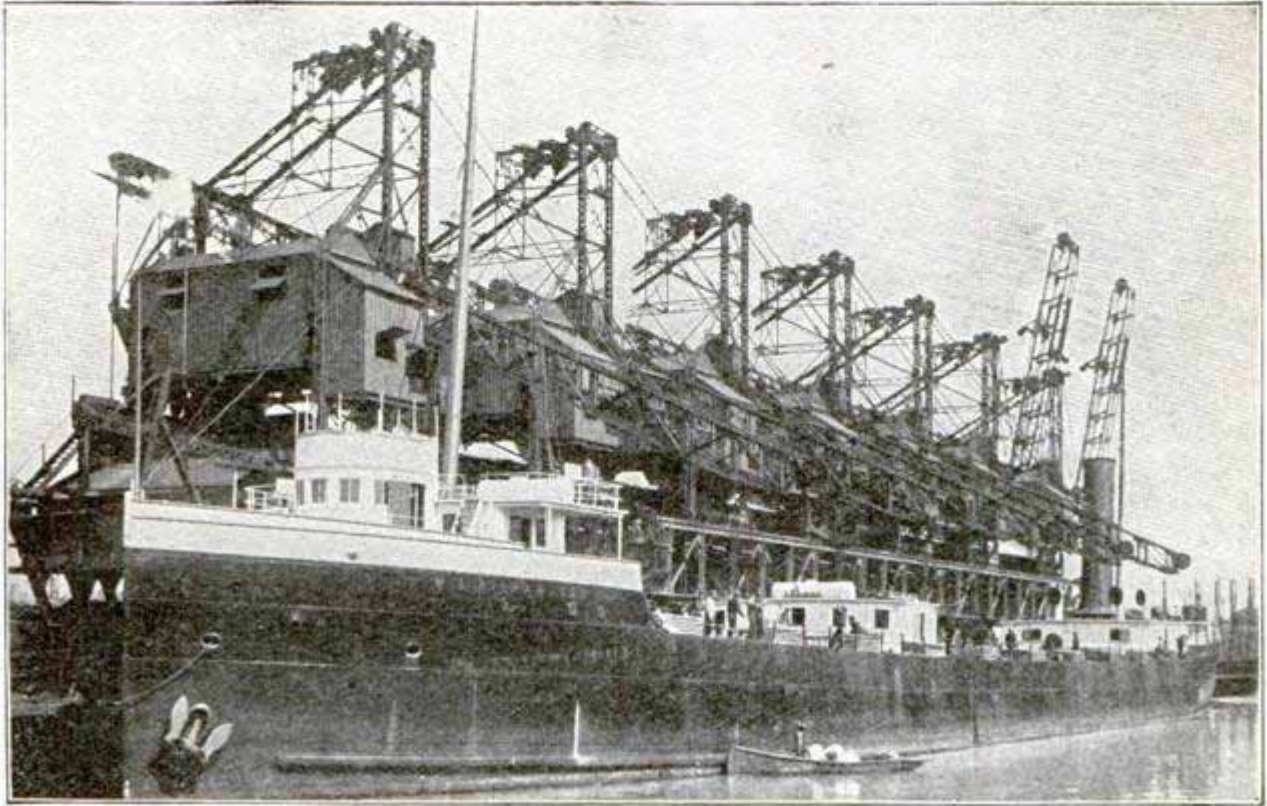
These coupons designated as "International Response Coupons," cost 6 cents and will be exchangeable in any country which has signed the agreement for a stamp equivalent to a United

States 5-cent stamp. The design of the coupon bears the two hemispheres, an artistic figure of a woman with arms outstretched connecting them, and lettered words explaining its nature. The sender places the coupon, which is printed on bond paper, 3 by 4 in. in size, in the envelope and the recipient exchanges it at the local office. All canceled coupons will be sent to an International Clearing House located at Berne, Switzerland.

Although the scheme, adopted by delegates of most of the civilized nations at the postal congress held in Rome, is not made compulsory, the following nations have signed the agreement: The United States, Great Britain, Germany, France, Austria, Spain, Japan, Holland, Norway, Sweden, Belgium, Denmark, Switzerland, Greece, Bulgaria, Crete, Luxemburg, Roumania, Siam, Hungary, Korea, Mexico, Costa Rica.

Commodore Peary's polar cruise has been abandoned for this year, as it was found necessary to fit the arctic steamer "Roosevelt" with new boilers.

BIG ORE DOCK AT ASHTABULA MOVES 1,000 TONS AN HOUR WITH 5-TON BUCKETS



Seven Great Machines for Unloading

The Union ore dock at Ashtabula harbor is one of the new and finely equipped docks which have enabled that port to double her capacity in the last three years. The doubling of the capacity of Ashtabula harbor means much to the traffic of the lakes, for

Ashtabula has long been known as the world's greatest ore-receiving harbor. The dock is equipped with seven machines for unloading; the buckets used are of 5-ton capacity. The seven machines will remove about 1,000 tons per hour from a modern ore carrier.

SKYSCRAPER CITIES IN DANGER OF CONFLAGRATION IN MID-AIR

The unlimited height of buildings in the big financial centers of the country, where the streets are being converted into narrow cañons by the walls of 30- and 40-storied buildings, will be the cause some day in the near future, according to the president of the New York Board of Fire Underwriters, of a devastating fire which will leap from skyscraper to skyscraper while the firemen swarm like ants impotently below.

To make impossible a still greater increase of this danger in New York

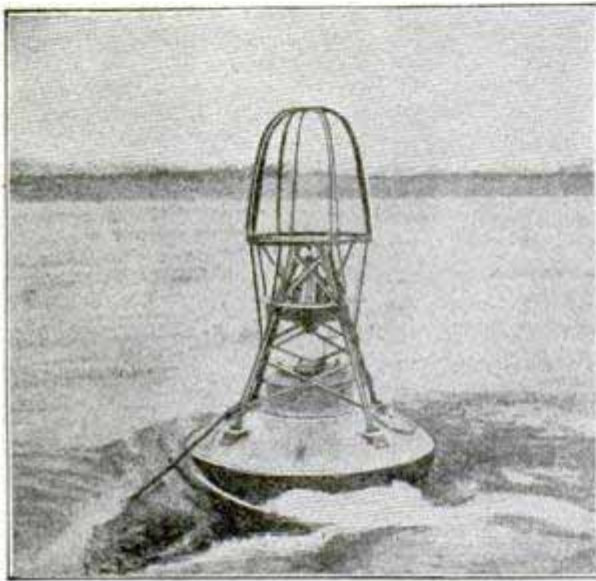
by the erection each year of more skyscrapers, the commission on the limitation of the areas and heights of buildings, was urged to recommend legislation limiting the heights and areas of buildings all over the city. One of the recommendations was the limiting of non-fireproof buildings to be used for commercial and manufacturing purposes, to a height of 55 ft. For fireproof buildings, provided with automatic sprinklers, and designed for office use only, a height of not more than 125 ft. was advised. Any height above

these figures was declared to be courting certain peril.

Legal and economic objections would complicate such a regulation, but the commission agreed that some sort of regulation should be enforced, and better today than 20 years from now.

ACETYLENE AS GUARDIAN OF THE SEA

If Your Light's Out—You're Out, Motto of Light-House Service—English System of Dues



Acetylene Buoy Light

The requirements of keepers of United States light-houses, any omission of which might result in the wrecking of a big ship on treacherous shoals, and the loss of hundreds of lives, were explained at the International Acetylene convention held in Washington, at which acetylene was heralded as the light of the future for guarding the sea.

"When the light goes out—you go out" is the motto of the United States light-house service. The board receives no excuses from the light-house keeper. His light must shine its warning to passing ships. From the time a keeper enters the service until the finish he is fully impressed with this idea. Ducks and geese may break through the quarter-inch French glass protectors and attack and destroy the lens, putting the light out of commission. In such a case the keeper must immedi-

ately hang up a lantern until the lens is replaced.

"If a keeper's light goes out he goes out of the service with it," said Captain A. Ross, U. S. N., member of the light-house board, who spoke before the convention. "So we desire the most efficient, and yet most economical, light in the market. The law allows us only a certain number of light-houses, buoys, and keepers. Money has a great deal to do with the efficiency of the service. We cannot pay more than an average of \$600 per annum for each keeper."

The English system runs to the other extreme, too many lights being more of a possibility than too few. Ships entering English ports are compelled to pay so much per ton as lighting dues, for every light passed upon the voyage. This is carried to such an extent that ships pay dues on lights they pass hundreds of miles away. American line steamers from the United States to Liverpool pay an average of about \$250 each trip for the maintenance of these lights.

PRISONERS MAKE ROAD SIGNS

The making of road signs, a unique industry for prisoners, has been installed by the Prison Department of the State of New York in the Clinton prison at Dannemora, N. Y.

The aim of the prison authorities is for the prisoners to produce a road sign weatherproof at all seasons of the year. To accomplish this the boards are made of seasoned 1-in. white pine, well protected with paint. The lettering is painted in black on a white background and is clearly legible at a distance of 50 ft. The painting is thoroughly weatherproof and the signs are expected to last indefinitely.

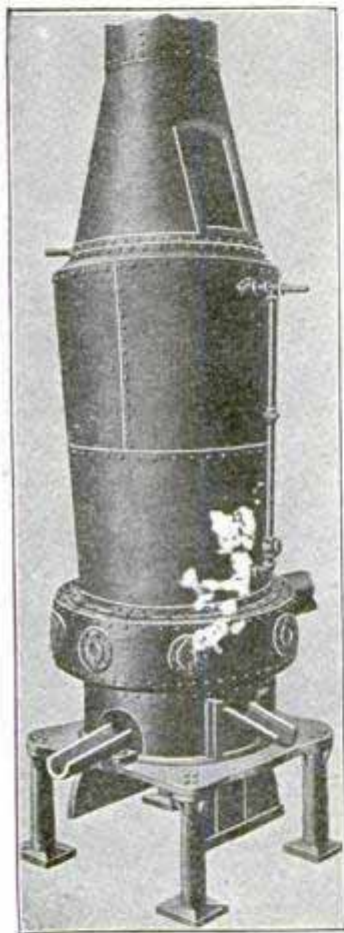
The boards are attached by bolts and nuts to wrought-iron standards, heavily coated with white lead as a rust pre-



ventive. The signs are made in a variety of styles and sizes, depending upon the nature of their location and use. The largest size makes possible the painting of the names of 10 or 12 towns and distances upon the two boards placed at right angles.

REFINING COPPER SCRAP

The ever increasing demand by refiners for old copper, brass and other alloy metals has given rise to the comparatively new industry of refining non-ferrous metal. All over the country scrap dealers are at work gathering together this waste metal, one of the most important items of which is copper.

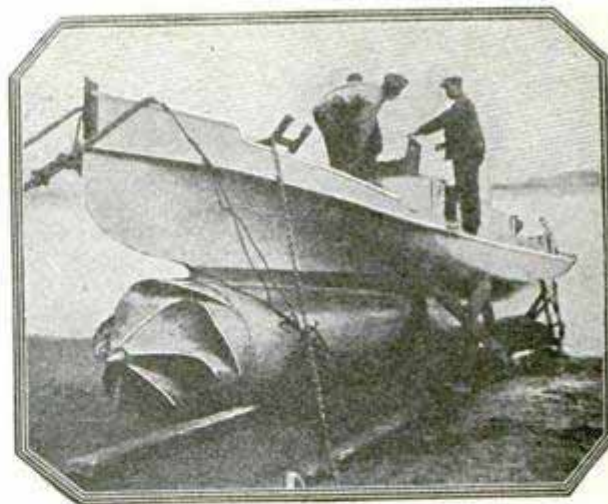


Reverberatory Furnace

Metallic scrap copper is melted in a reverberatory furnace. The slag, consisting of from 30 to 70% copper and impurities contained in the charge or caused by combination with oxygen and the fire brick lining of furnaces, is recovered by smelting in a cupola of small round water jacketed blast furnace as shown in the cut.

REMARKABLE ELEPHANTS!

A tale comes from Wheeling, W. Va., of a wise elephant who lifted an engine from the body of a pinioned engineer, and eight other elephants who, filling their trunks with river water, extinguished the flames and distinguished themselves.



Propelled by blades arranged spirally around a shaft which revolves inside a cylinder, this quaint craft, called "The Typhonoide," is expected by its inventor, a Frenchman, to reach a speed of 60 miles an hour. The cylinder runs the entire length of the keel, somewhat resembling "Archimedes' screw." According to its inventor, the boat has already attained a speed of 40 miles an hour.

CHURCH BUILT OF CEMENT BLOCKS



The use of cement in the construction of public buildings is rapidly increasing. The church illustrated cost \$125,000; the interior walls are of common brick, but the exterior, including the spire is of cement blocks, either rock faced or plain finish.

STEAM FREIGHT TRAIN FOR THE HIGHWAYS

cient quantity of water and oil fuel are carried to give the train a radius of action of 50 miles.



Hauling at Three Cents a Ton Per Mile

On the highways in the vicinity of Seegefelf, near Spandau, Germany, a steam-driven vehicle train of novel type is regularly engaged in the transportation of heavy merchandise. Both the locomotive and the wagons which it pulls are of original design. The latter, as may be seen from the accompanying illustration, have extremely large wheels, with the corresponding advantage in ease of traction; but the construction is such that there is no sacrifice of flexibility or of ability to negotiate curves.

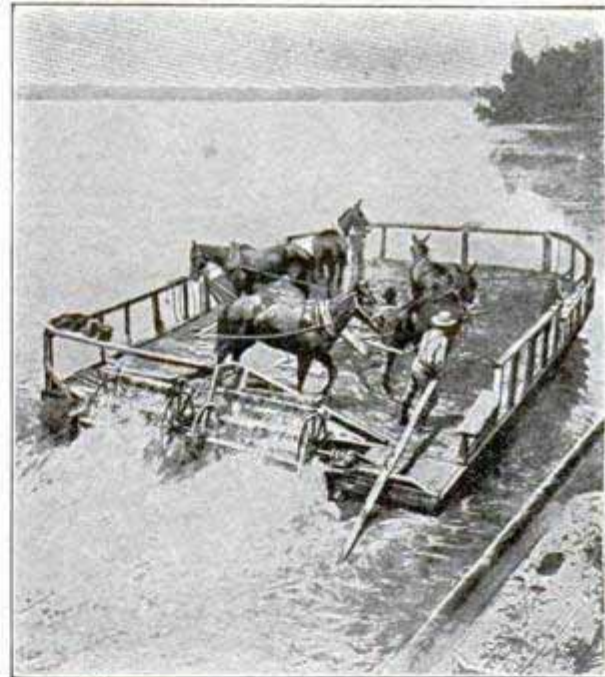
Each vehicle unit consists of two parts which are coupled together to form practically a four-wheeled wagon. The coupling is rigid in the direction of vertical stresses, but free bending movements sidewise are allowed and regulated by the curved bumpers which are fitted with cogs and which mesh like sections of gear wheels at the coupling. By this means the train can take curves of 23 ft. radius and drive backward or forward on either a curve or a straight line.

The locomotive operates by steam generated in a water tube boiler. The fuel used is oil, which is sprayed into the fire-box by steam. The capacity of the locomotive is 30-hp. and the consumption of fuel per horsepower hour is said to be about .22 gal.

It is claimed that the trains can carry a net load of 20 tons on a level at a speed of 5 miles per hour and can take gradients up to 1 in 20. The working cost by the system is said to be about 3 cents per ton mile. A suffi-

QUEER HORSE POWER FERRY

This type of river ferryboat propelled by horse, like an old-fashioned threshing power outfit, was formerly to be



seen on the Mississippi river. As the horses traveled in a circle the power was transmitted to stern paddle wheels. Ferries of the same construction have recently been discovered in Central Asia.

In a Paris church a gramophone in the chancel makes the customary responses for mass and also sings the canticles.

The Japs have ordered from Germany new guns and ammunition worth \$10,000,000; also, ten war balloons.

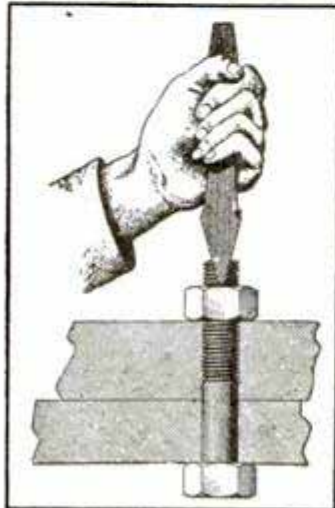


SHOP NOTES



To Remove Rusted Nut

A nut sometimes is rusted to a bolt so solid that it is impossible to remove



as shown in the sketch.

by ordinary means. To force it with a wrench would only result in breaking the bolt and causing a large amount of extra work, says *The Automobile*. The only thing to do is to sacrifice the nut by splitting it with a chisel,

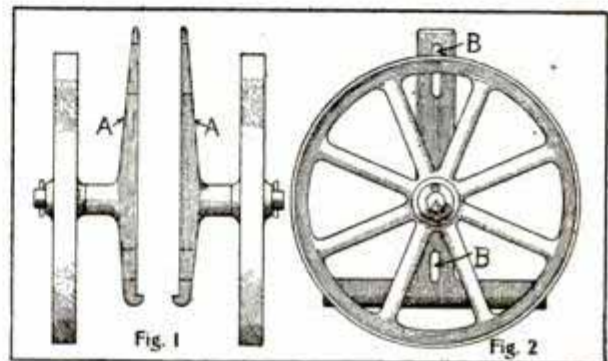
Cement Piers for Scales

The use of a wood frame support for scales if placed in a pit causes too much dampness for the wood timbers and in time they will rot. Fig. 1 shows how a common wood frame support is constructed before placing in a pit. A correspondent of *American Miller* constructed a support as shown in Fig. 2 with 6 in. by 8 in. sills placed on a brick foundation and with cement piers built in the corners AA. These piers were made 1 ft. high, on which were placed the saucers that hold the balls. Just as the cement was about hard the

saucers were fastened to the cement with lag screws. When the cement set this made the saucers firm and solid.

Special Engine Frame Truck

In railroad shops, where it is necessary to remove a frame from a locomotive and transfer it to another building on the grounds, a truck of some kind must be used. The accompanying sketch shows how such a truck may be



Truck for Engine Frame

made for this purpose. The truck is constructed entirely of iron with cast iron wheels 32 in. in diameter. A wrought iron tire $\frac{5}{8}$ in. by $3\frac{1}{2}$ in. is shrunk on the rim of the cast wheel. The jaw and axle (A, Fig. 1) is made of one forging or casting. It takes very little time to fasten an engine frame between the jaws AA with bolts through the slots BB. A heavy engine frame can be taken any place about a

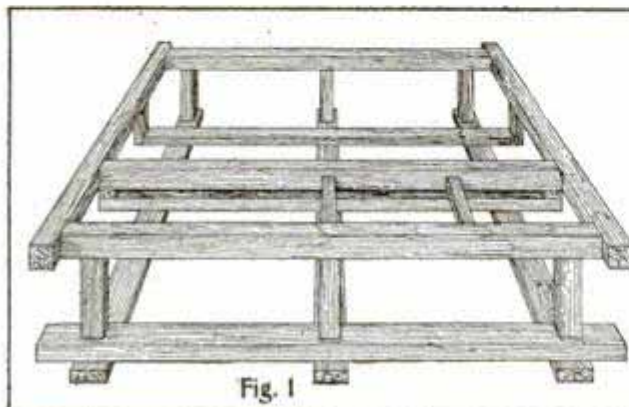


Fig. 1

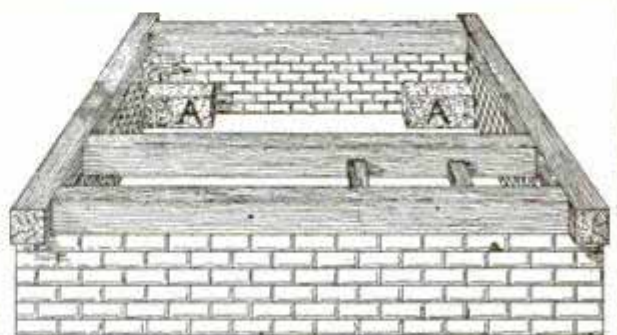


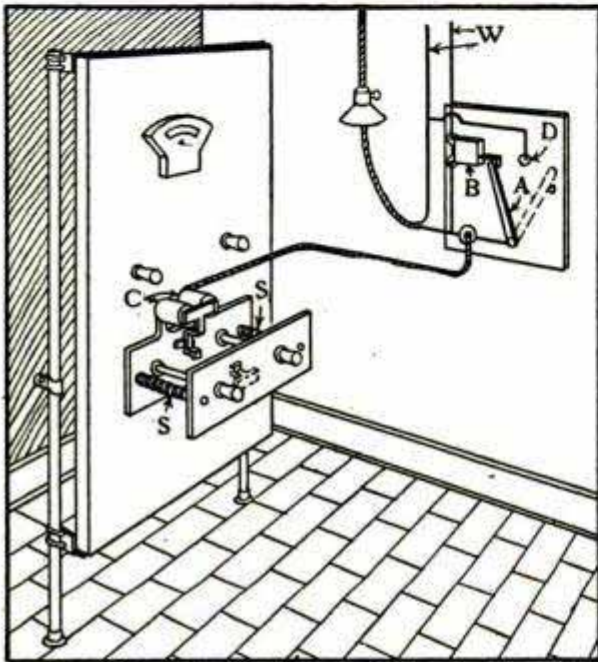
Fig. 2

Construction of Cement Piers for Scales

large shop in this manner.—Contributed by D. H. Utter, Sayre, Pa.

Pulling Arc Light Switch Plugs from a Distance

In a certain place which was a long distance from the station switchboard and where old iron telephone wire was



Operating Switch Plugs from Distance

used to close the circuit, an arrangement as shown in the accompanying sketch was made to draw the plugs on an arc light switchboard.

The coils, C, which release the springs, S, on the plug drawing attachment are coils from an old arc light. These coils are operated through a local circuit using an ordinary buzzer, B, for a relay, which releases a small arm, A, operated by a spring, making a momentary contact on point D, thus closing the circuit through the coils. The wires, W, are the iron wires connected to a push button at the house.

This could be used nicely without the relay attachment if the distance were short. As the house is some distance from the station and an old iron telephone wire was used, the resistance was such that the main coils could not get enough current to operate them with success.—Contributed by H. S. Brink, Fort Des Moines, Iowa.

To Print on Tracing Cloth with a Rubber Stamp

Prepare the part of the tracing to be printed by scouring it good with pulverized French chalk to remove any grease spots and after dusting off all loose chalk apply the stamp in the usual manner, using any good brand or color of glycerine stamping ink.

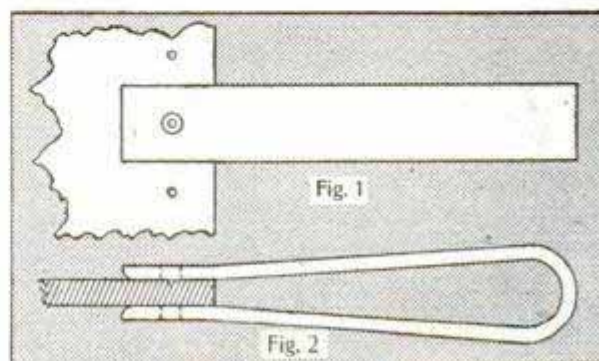
After the stamp has been applied cover it again with pulverized French chalk, this time rubbing it lightly with the finger until the ink forming the letters has soaked up enough chalk to make them appear raised. Then dust off the loose chalk and the tracing is ready to use.—Contributed by E. W. Bowen, Denver, Colo.

Uniform Heat for Melting Brass

In melting brass or similar metals, too strong a heat is detrimental. Portions of the metal exposed will be melted and oxidized before the remainder is melted, says Brass World. The best practice is to have the metal melt as uniformly as possible so that all portions become liquid at about the same time. This avoids overheating any portion of it.

Transferring Punch Marks on Boiler Plate

The sketch shows a device for use in boiler shops, where, as it frequently happens, it is required to transfer a prick punch mark from one side of a marked plate to the other. Its application is shown. The two holes in the

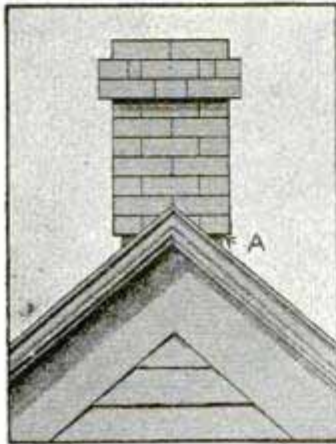


For Transferring Punch Marks

jaw are drilled in line and the one hole is placed so as to register with the punch mark (Fig. 1) and the spring of the jaws holds it in place, so that the plate may be turned over (Fig. 2) and the other center scribed or prick-punched, as may be desired. Any piece of flat steel may be used that has spring enough to adapt it to the thickness of the various plates.

What to Prevent in Building a Chimney

The settling of a chimney when built on a frame roof is not always taken in consideration

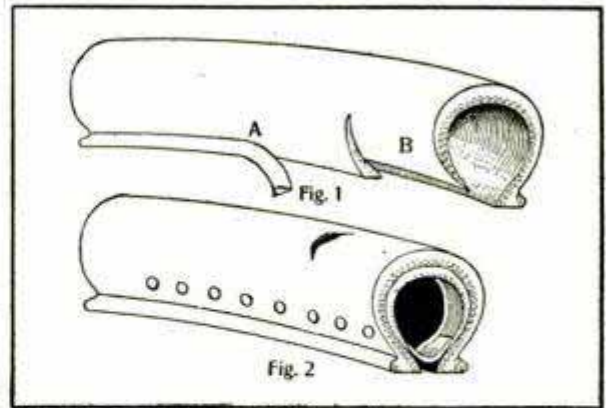


and the result is that the extended part of the chimney, shown at A in the sketch, is left to rest on the roof and the part below settles and leaves a crack through the mortar and brick. Many fires have been caused by this fault of construction. Enough space should be allowed for the settling at point A.

How to Repair Tire Casings

An old tire casing that may not be in a condition to warrant the repairing by a regular repair man can be put in condition to get several hundred miles of service from it, says The Motor Way. If it is blown out, carefully clean the inside of the cover with gasoline for about 5 in. each side of the hole. Then take one of your covers that is in bad condition and cut a section, about 10 in. long, out of the best part of it; cutting the beads, A, Fig. 1, from it and trimming it with a sharp knife at the edges to a thin edge, as shown at B. Carefully clean the outside with gasoline and when ready apply three coats of solution to the inside of the shoe to be repaired, allowing each coat to dry well, also about two

coats on the outside of the repair piece, and apply together as you would a patch on an inner tube.



Repairing Tire Casings

Rivet the patch to the tire casing by using small copper rivets or split rivets in a single row, about 1 in. from the bead (Fig. 2), placing the rivets about 1½ in. apart. After this is done canvas should be cemented to the inside of the casing, covering the entire patch, so as to make a smooth surface for the inner tube.

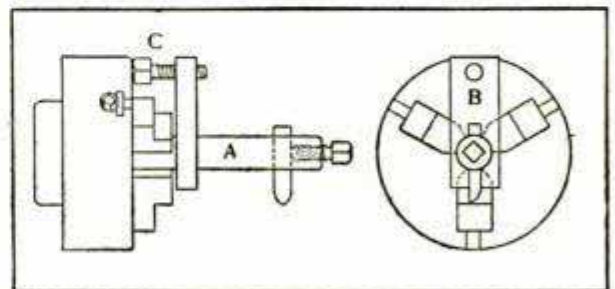
To Remove the Odor of Paint

Place a vessel of lighted charcoal in the middle of the room and throw two or three handfuls of juniper berries on it. Shut the doors, windows and all means of ventilation for about 24 hours and the smell will be entirely gone. This process will not injure curtains, carpets or furnishings.

How to Make an Adjustable Boring Bar

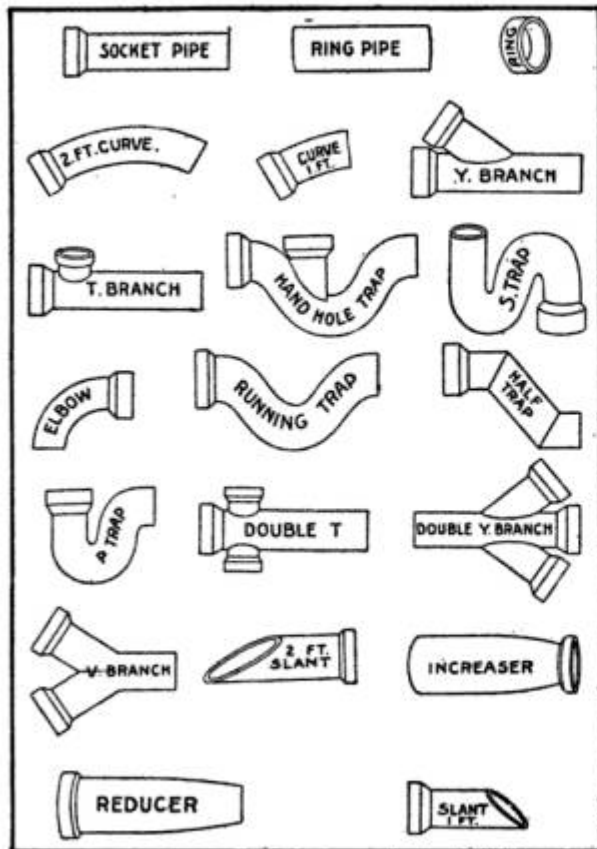
A quickly made adjustable boring-bar can be constructed as shown in the sketch, says the American Machinist.

The adjustments of the bar, A, are



Adjustable Boring Bar

obtained by the screw, C, which passes through the plate, B, and bears against the face of the three-jawed chuck.

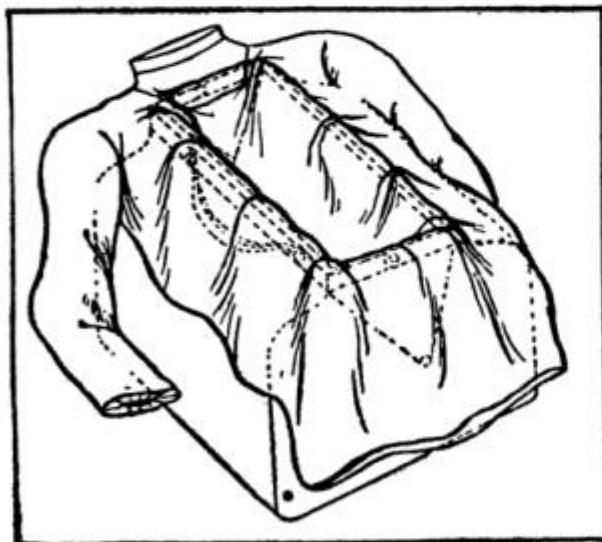


Courtesy Domestic Engineering.

Types of Sewer Pipe Joints

Emergency Tire-Testing Tank

The accompanying sketch shows what may be done with the ordinary materials that are carried in an automobile at any time. A traveling grip, emptied of its contents, with any water-proof garment pressed down into its mouth, can be filled with water, says a correspondent in *The Motor Way*. With this aid a puncture can be easily located. If there is no water at hand the water



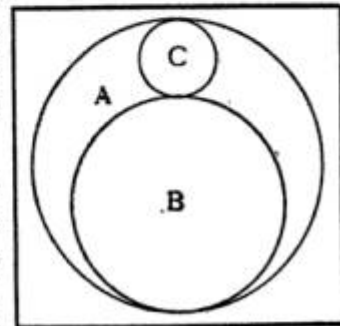
For Locating a Puncture

from the acetylene generator can be used, even though there is a small quantity, as the shape of the tank can be changed to fit the tube.

Changing Pulleys

In changing pulleys on line shafts or other places it may be desirable to know how much to cut out of or add to a belt, and have it come right. That is to say, if a belt runs over two pulleys 30 in. in diameter, and the pulleys were to be changed to 36 in., the belt would need to be as much longer as one pulley is larger around than the other.

The difference of the distance around two pulleys of unequal size is the same



as the distance around a small pulley the diameter of which equals the difference between the diameters of the two, says *Power and Transmission*.

For instance: the distance around a 14-in. pulley is 44 in., and the distance around a 21-in. pulley is 66 in.; but, knowing the fact that the latter is the same as the distance around a 7-in. pulley, it is only necessary to determine that to get the correct result, 22 in.

The circumference A in the illustration equals the sum of the circumferences of the two, B and C.

Care of Paint Brushes

Always clean a new brush before putting it into paint. Work it briskly back and forth through the hand until most of the dust and loose bristles are out, soak in water until wet through and then swing and shake till dry.

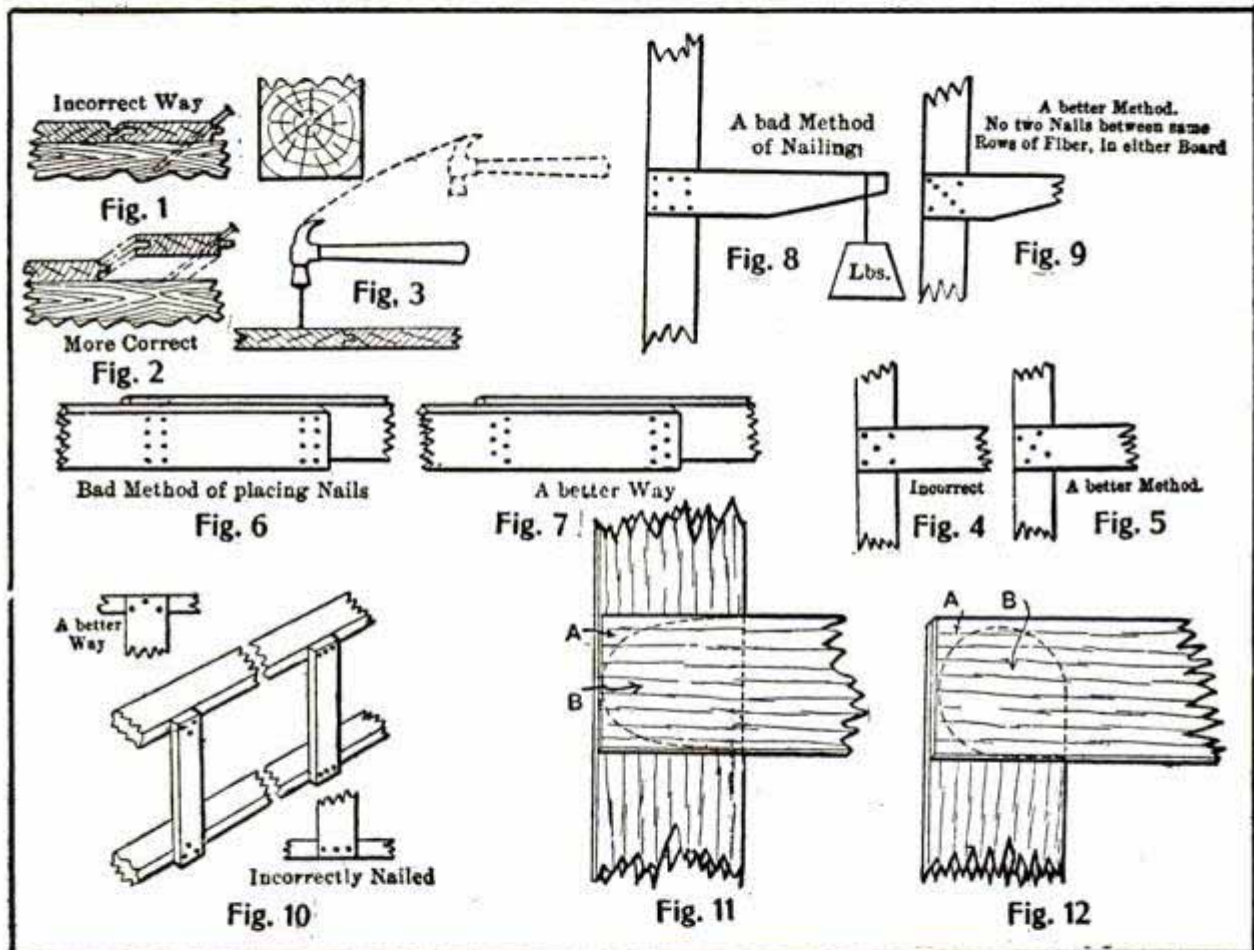
For varnish and buggy paint the brush must be more thoroughly cleaned, until all loose hairs are out. Brushing it over sandpaper is good. Wash out in turpentine, not water. When not in use keep suspended in the varnish.

THE PROPER USE OF NAILS

One of the simplest details in correctly driving a nail is almost ignored by the ordinary workman. When a flooring or sheathing board is drawn in place the nail is set slanting and driven as shown in Fig. 1. If the board be lifted from the support about $\frac{3}{4}$ in., drive the nail through until it strikes the studding or joist, then finish driving the nail, taking along with it the board, as in Fig. 2, and the results are

ing and some methods that are more nearly correct.

Another point in locating the position for the nails, especially near the end of boards, is this: It should be remembered that the danger of splitting the board is limited to a well-defined field, the extent of which varies with different kinds of wood, but the general shape is about the same as indicated by the dotted line in Fig. 11,



Advantageous Locating of Nails

much better, says a correspondent in Wood Craft.

To drive a nail in a confined place where a full swing of the hammer cannot be obtained the full force of the hammer can be obtained by moving the arm ahead at the time the blow is being struck, as in Fig. 3.

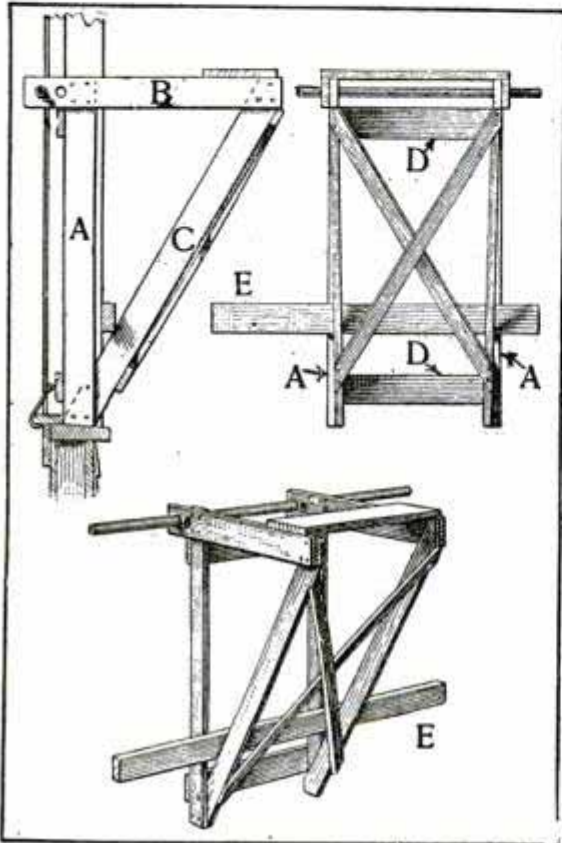
The location of nails should be placed staggered or zigzag, so as to be out of the line of the same fiber of wood. The illustrations Figs. 4 to 10 show some examples of incorrect nail-

ing which is supposed in this case to apply to a board 1 in. or less in thickness. A represents the area of risk, B the field of safety—so far as the splitting of the board is concerned. Fig. 12 shows a variation to fit another condition.

Probably the heaviest chain ever made has been turned out by an English firm for the Japanese government. The common links weigh 200 lb. apiece, and the end link 300 lb.

A Home-Made Tinsmith's Window Jack

A window jack which can be used for a variety of purposes may be made at small expense by any mechanic. The



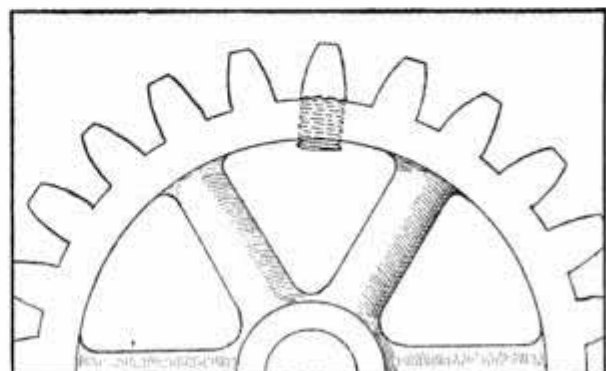
Details of Tinsmith's Window Jack

entire jack is built of strips of 1 in. by 4 in. wood and when completed it has strength enough to hold any reasonable weight, says *The Metal Worker*. The seat is made of 1 in. by 12 in. board 2 or 3 ft. long. The upright pieces, A, are 4 ft. long and may be left wide enough at the bottom for a notch to prevent slipping in too far on the window sill. The horizontal piece, B, is cut about 3 ft. long and should extend beyond A, with holes bored to receive a piece of $\frac{3}{4}$ -in. gas pipe. The pieces C form the brace to which are nailed two strips of 1 in. by 2 in. material crossed. These strips will keep the jack from twisting. The pieces D are cut about 2 ft. long, but can be any length to suit the width of the jack. A loose piece of 2 in. by 4 in. material $2\frac{1}{2}$ or 3 ft. long is used at the bottom to keep the jack from slipping in on the window sill.

As the jack is light, it is easily carried to the window and attached by setting the foot of the jack on the window sill and running the piece of gas pipe through the holes, so as to prevent it from falling out of the window. The loose piece of 2 in. by 4 in. material is then placed, as shown, across the window, so that the foot of the jack cannot slip in at the bottom. The weight of the jack will then hold it in position and it is a simple matter to climb out on the seat so that a tinner may flash around the top of a window or put in a new window head if desired. Two of these jacks extending out of two different windows with a plank across offer a very good scaffold for mounting a cornice or similar work. To avoid the use of the loose piece at the bottom the side pieces may be made 8 in. wide, notching the bottom 3 or more inches in from front to back and at least 4 in. deep to let the foot of the jack catch the window sill and to prevent it from slipping into the building at the bottom.

Repairing a Broken Cog

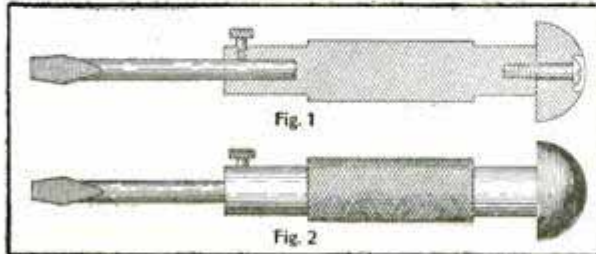
A cog in the main drive gear on our concrete mixer broke at a time when we could not afford to shut down, and as we were 70 miles from the shop, we made the repairs in a short time by threading two $\frac{3}{4}$ -in. holes in the gear at the point where cog was broken and screwed in two steel bolts, riveted the bottoms and dressed up the bolts as shown in the cut. This worked nicely until a new gear could be made, which was several weeks.—Contributed by Frank L. Cash, Haralson, Ga.



Showing Repaired Cog

A Handy Tool Holder

A handy light tool or screwdriver holder may be turned up from a piece of cold rolled steel. It is turned to the shape as shown in the cross section, Fig. 1, with a hole drilled in one end to insert different tools, while the other end is drilled, tapped and fitted with a

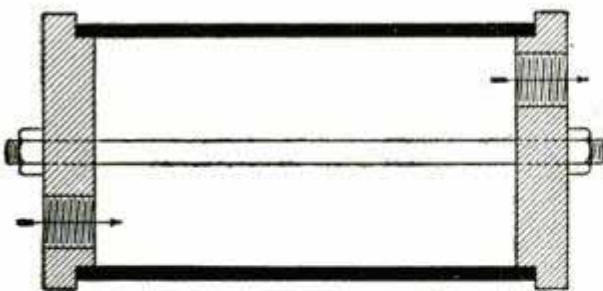


Turned from Cold Rolled Steel

screw which holds a rounded fiber handle loosely. The center part of the holder is knurled as in Fig. 2 and filled with a thumb screw to hold the tools.—Contributed by Frank Schwab, Geneva, N. Y.

Excellent Home-Made Muffler

The illustration shows a muffler for marine gasoline motors that has given great satisfaction. For 3 or 4 hp. it is made of a piece of 5-in. iron pipe, 12 in. long, with cast-iron heads. A bolt



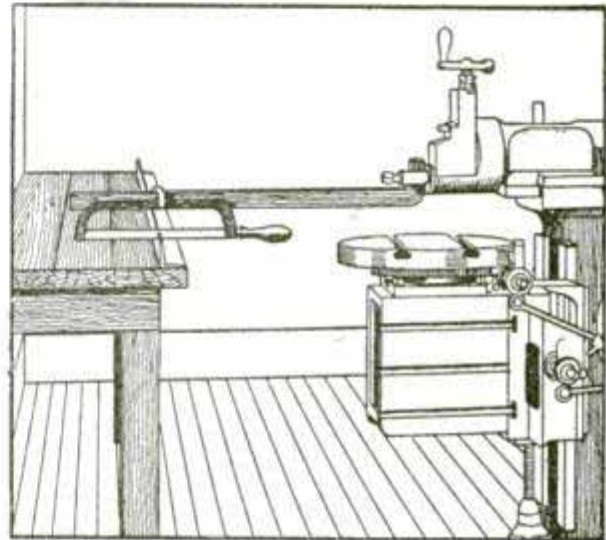
Muffler for Marine Gasoline Motors

running through the muffler holds these heads in place. The inside of this device is filled with old wire. Part of an old woven wire mattress makes an ideal filler. If there seems to be back pressure when the engine is running some of the wire may be removed, until the muffler is adjusted to get the best work out of the engine. Water may be pumped through the muffler if desired, in which case the amount of wire filler

can be greatly reduced. It has been found very satisfactory to make the outlet one size larger pipe than that through which the burned gases enter.—Contributed by "Boston."

Substituting a Shaper for a Power Hack-Saw

Where a number of angle irons had to be cut with a hack-saw and there was no power hack-saw in the shop, a shaper was used in its place. A bar of metal, long enough to reach the bench and turned in the shape of an L at one end, which was fitted in the tool post of the shaper, and a hand hack-saw clamped to



Substituting Shaper for Power Hack-Saw

the other end completed the arrangement. The angle iron was clamped to the bench at the right place and the shaper put in action. The bar of metal furnished the weight for the hack-saw to make the cut.—Contributed by C. F. H.

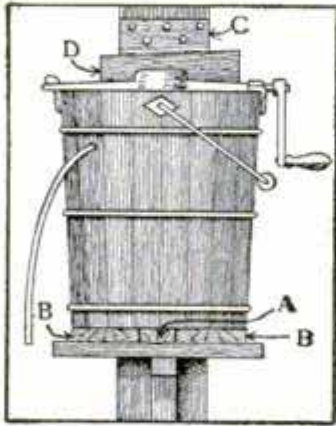
Cleaning Hot Brass

For cleaning hot brass cylinder heads and jackets try the following recipe, which a correspondent of the Practical Engineer says works fine:

Sift coal ashes fine and mix with kerosene oil to a thick paste; add as much air-slaked lime as can be conveniently mixed with it. Apply this polish to the bright parts, rubbing hard; wipe off and polish with dry slaked lime.

A Handy Ice Cream Freezer Shelf

Fasten a shelf, large enough for an ice cream freezer, the right height to a post or wall. On the surface of the shelf nail a cleat, A. Fasten two pieces of wood, BB, the same thickness as the cleat on the bottom of the freezer, leaving space enough between them to allow the cleat to fit in it. The cleat will prevent rotation and movement of the freezer on the shelf. On the post or wall above the rim of the freezer nail another cleat, C. The freezer is then held firmly in position by the wedge, D.—Contributed by James H. Beebe, Rochester, N. Y.



To Keep Dirt from Sticking to a Shovel

Working on the levees in the rice fields, I had a good deal of trouble from the dirt sticking to the shovel. I drilled four small holes through the shovel,



Dirt Will not Stick to This Shovel

which made the shovel self-cleaning.—Contributed by William L. Walker, St. Charles, Ark.

A New Method of Putting Out a Fire

I was alone and a fire started in the roof of my house. There was no ladder at hand and it was too far to throw the water. I filled some corn cans with water and threw them one at a time on the spot where the fire was burning. The empty cans would roll

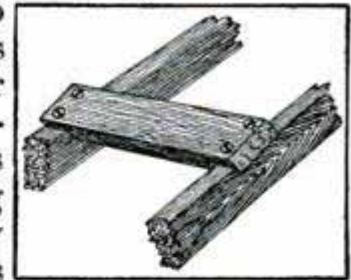
down to be filled again. The location of the fire necessitated my throwing the cans against the wind. In this way I put out a fire that covered 10 sq. ft. in the center of the roof.—Contributed by Sim Harris, Boonville, Colo.

Repairing a Water Closet Trap Valve

Take down the box and disconnect the ball and rod from the plunger by removing the screw. Take out the plunger and put a little machine oil on the top of it and sprinkle with some fine emery. Turn the plunger over and drop into valve. As the plunger and valve are turned work a true bearing is made on the seat. Put a screwdriver into the screw that holds the disk and turn back and forth until a good seat is formed on the valve. Clean out the emery and put on a new disk and you have practically a new valve.—Contributed by William King, Cleveland, O.

A New Kink in Ladder Making

If the rungs of a ladder are made of wood that will split easily then it will be necessary to bore small holes for the nails or screws. To prevent the rungs from splitting when a heavy person mounts the ladder a slanting notch is sawed where each one is fitted, as shown in the sketch. This will make it very light and strong.—Contributed by J. M. Myers, Davenport, Wash.

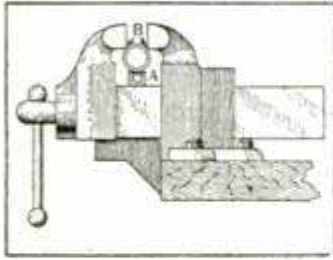


Melting Copper

It is important that none of the copper to be melted should project above the charcoal. Any copper not covered by charcoal will be oxidized or "burnt," and the casting will be weak and full of holes.

Utility Pipe Vise

Here is a kink that shows how a common vise will hold a pipe when other ways fail. An old nut or piece of iron of the right size is placed in the vise at A, which will keep the pipe in position so that the corners of the jaws, B, will close on the pipe. This will not rough up the pipe as when a pipe vise is used.—Contributed by Willis Ferguson, Pisgah Forest, N. C.

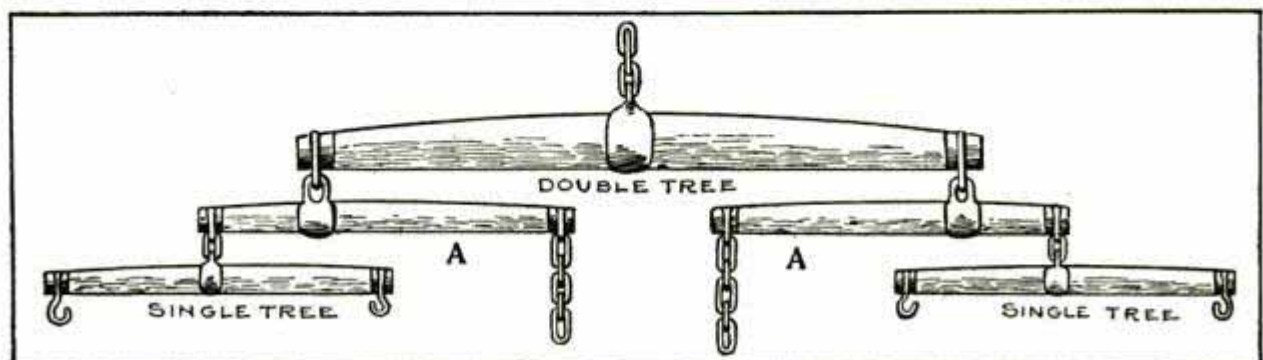


To Assist in Making Forgings and Welds

Direct a jet of compressed air against the heated ends of the work. The air blast will cause a display of fireworks and will considerably raise the temperature of the metal just prior to making the forging or weld. By this means it is possible to revive the heat in a piece that has become cooled. The air jet will also blow off all dirt and scale. Try it on a bar of metal and see how it works, says *Electric Traction Weekly*. It will burn the metal faster, but it will increase the heat.

A Three-Horse Evener for Use without a Tongue

The accompanying sketch shows a three-horse evener for use on a plow or harrow where there is no tongue. The principle is the same as the one previ-



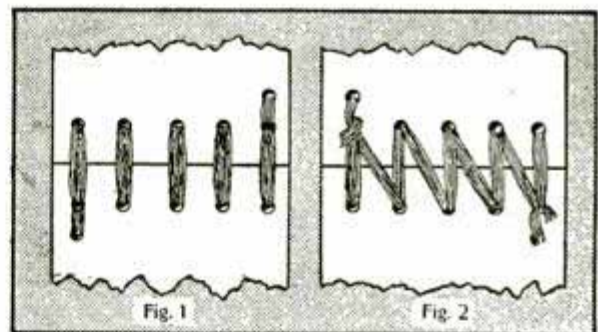
Three-Horse Evener where no Tongue is Used

ously described in these pages, but this plan makes a lighter evener and has less rigging. The equalizers as shown at A are of 2-in. by 3/8-in. iron about 18 in. long, with the holes punched one-third of the distance from the ends. An old singletree iron welded on the long end will be strong enough. On the short end a heavier hook is needed and this is supplied by a small clevis and a ring for the middle of the singletrees.

This arrangement can be attached to any two-horse whiffletrees in a few minutes, says a correspondent in *The American Blacksmith*. By using this plan and crossing the traces the inside horse will have plenty of room without chafing his legs on the traces.

Picture Wire for Belt Lacing

The accompanying sketch shows a novel way of using a picture wire for a



belt lacing. A 2-in. belt laced in this manner and running over a 24-in. wood pulley and a 6-in. iron pulley where the speed of the former is 247 r. p. m. has been in service for several months with best results. Fig. 1 shows the outside of the lacing and Fig. 2 the inside.—Contributed by J. E. Morris, Columbus, O.

A Home-Made Cement Block Mould

The lumber necessary to make this mould should be of selected white pine or hardwood free from knots and sap. The base board, A, Fig. 1, should be 14 in. wide by 24 in. long, well battened together. The sides are made as shown with a cleat on each end, which overlaps the end pieces and holds them in place. Both the ends and sides are fastened to the base with hinges, which permit them to be turned down to take out the completed block. On each end is placed a flat iron bar with a bend or notch in it to hold the sides together. These bars are the same as hooks with the ends extended to form a handle for convenience. The end pieces have a thin piece of board fastened in an upright position on their inner surface to form a key between the completed blocks.

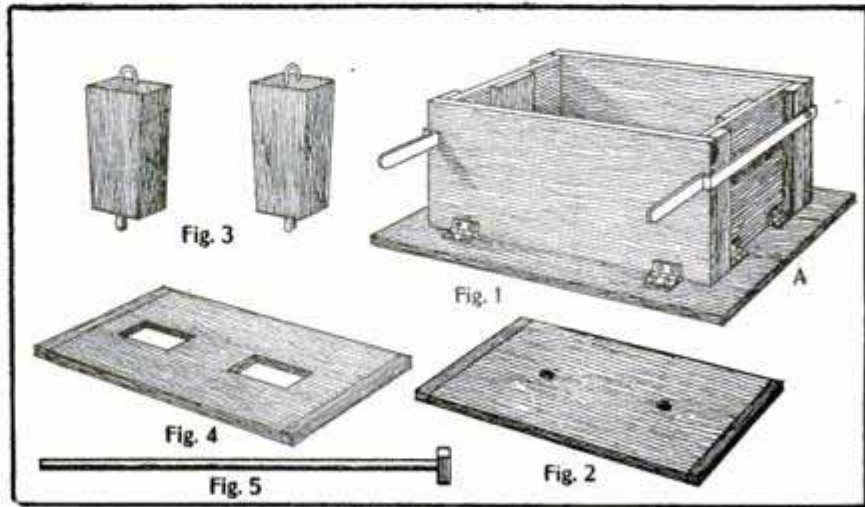
The bottom board, Fig. 2, is to be fitted in the bottom of the mould loosely and can be blocked up from the bottom to make the right size block.

The plugs, Fig. 3, are made with a taper on both sides so that in removing them they will clear all the way out. The pins in the bottom of the plugs are to fit in holes in the bottom board, which will hold them in place.

When the plugs are to be removed take the board with the two square holes, Fig. 4, and place over the top of the mould and with the handle of the tamper bar, which is run through the rings in the top of the plugs, lift them upward, using the board as a guard to prevent the block from being broken. This board should not be used until the block is finished and ready to take out of the mould.

The tamper, Fig. 5, is made of a piece of iron rod about 18 in. long with a large nut threaded on one end.

To make the blocks use one part of Portland cement and three parts of good, sharp sand. Mix well and put enough water on to simply dampen the whole mixture. Close up the mould and put in the plugs, and then fill the mould one-quarter full of the mixture

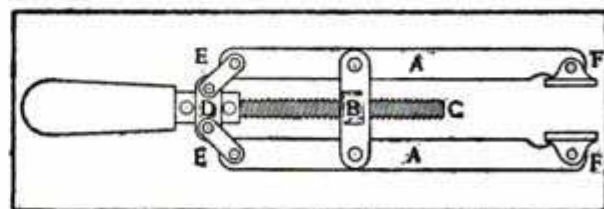


Mould for Cement Blocks

and tamp down hard. Repeat this until the mould is filled and then scrape off the surplus material, remove the plugs, turn down the sides and lift out the finished block. The block should remain on the bottom board until it is hard enough to remove. It will be necessary to have a number of bottom boards. The finished blocks must be sprinkled with water from day to day for a duration of 15 to 30 days to properly cure them before using. A barrel of cement will make about 50 blocks.

A Pattern-Maker's Clamp

A very handy clamp for pattern makers' use can be made as shown in the illustration. The device consists of two levers, A, pivoted on the brace, B, which is threaded to receive the clamp screw, C. On this clamp screw is mounted a bushing, D, to which are connected the



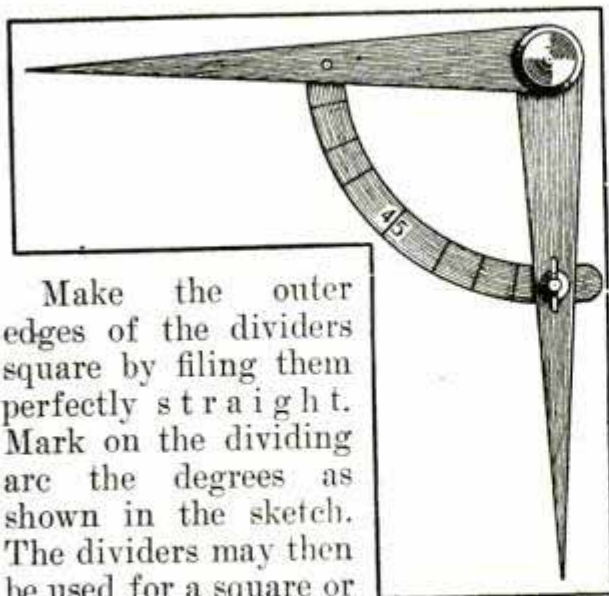
Clamp for Pattern-Makers

links, E. These links, in turn, are connected to the levers, A. The end of the levers are each fitted with a swivel jaw, F. The action of the clamp is readily seen and the clamping pressure is very great on thin work, due to the toggle action of the links.

Cleaning Machinery

Dissolve 1 lb. concentrated lye in about 2 gal. water, and with a mop saturate the engine with the liquid, being careful that it does not get into the oil holes of the journals and bearings. After the lye has eaten all the grease and gum from the surfaces, clean perfectly by scraping and brushing, and after the iron is dry and free from grease, apply a thin coat of lead paint, says Thresherman's Review. After this is thoroughly "set," paint the iron a deep black and varnish heavily. Coloring, striping or decorating should be done before varnishing. Then the engine can be easily and quickly cleaned with a dusting cloth, and escaped oil can be wiped off very easily.

How to Use Dividers for a Square

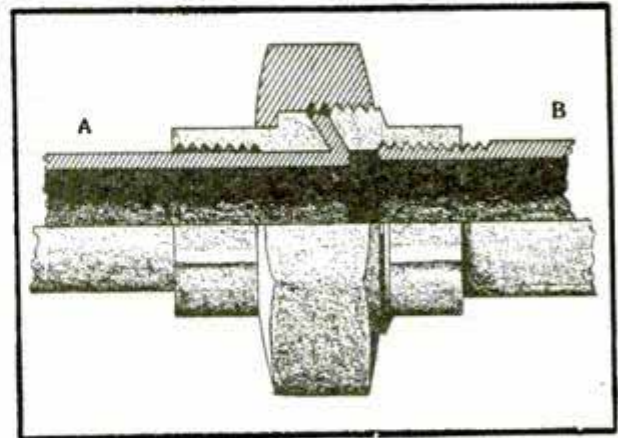


Make the outer edges of the dividers square by filing them perfectly straight. Mark on the dividing arc the degrees as shown in the sketch. The dividers may then be used for a square or protractor in laying out an angle.

Dusting finely ground emery upon paper or cloth that is coated with a thin glue makes emery paper and cloth.

Connecting Iron Pipe to Lead Pipe

Should it be necessary to repair a lead pipe and the tools for making a wiped joint are not at hand, or where



Use Union as Shown

an iron pipe must be attached to a lead pipe, the connection or repair may be made by using a union as shown in the sketch. The union must be of a size that the lead pipe, A, will just slip through the threads. After the parts of the union are on the lead pipe the latter is belled out, forming a flange. This flange makes the gasket for the union. The iron pipe, B, is screwed in to the other part of the union and the connection is made as shown.—Contributed by Alexander A. Gallich, Chicago.

Home-Made Cableway

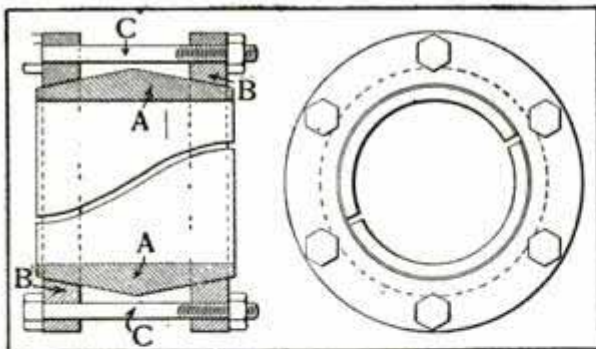
The embankment on a railroad at a certain place was 70 ft. high and in building the concrete culvert through it at the base all materials had to be lowered from the tracks above, says Engineering-Contracting. A cableway was constructed by using a wire rope that passed through a double block at the top, attached to a post sunk in the embankment, the lower end of the rope being attached to another post at the site of the work. On this rope ran two boxes, having deep drop bottoms, and hung from the cables by small snatch blocks. These boxes were fastened to the cable by a 1½-in. rope in such a way that when one box was at the top

the other would be over the mixing board at the bottom. When the loaded box descended it pulled up the empty one. The speed was controlled by a brake stick.

How to Make a Commutator Press

A press is necessary in the building and rebuilding of commutators to firmly press the segments together so as to hold the mica securely and prevent oil and dust from getting between the segments, says *Electric Railway Review*. A home-made press can be cheaply made in almost any small repair shop, as shown in the sketch.

The press consists of a diagonally split steel shell, A, tapered toward both ends, the slope being about one in ten. The inside diameter of the shell is just a little larger than the diameter of the assembled commutator which it is desired to press together. Two heavy steel rings, BB, fitting the shell, A, can be drawn together by means of six or eight bolts, CC. The force with which the segments and mica can be pressed together is only limited by the strength of the rings, BB, which are made exceptionally heavy.



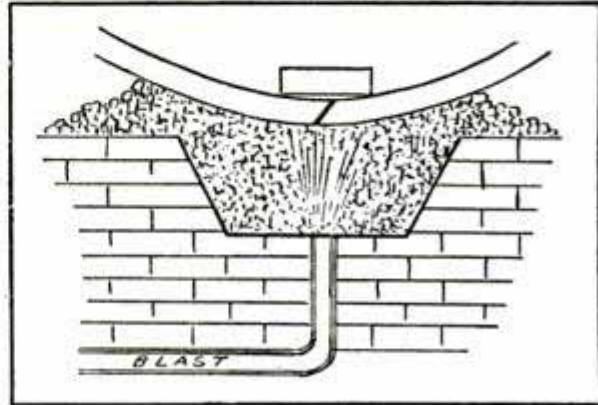
Plan and Section

The bolts CC and the rings BB are removed and one of the rings and the shell A are slipped over the assembled commutator bars and mica. The rings are then put in place and the bolts uniformly tightened. When sufficiently tight the whole can be put in a lathe and the commutator bars can be bored out true to receive the commutator shell and its insulation. When this insulation has been properly placed in posi-

tion, the clamping ring is warmed and put on over the end insulating ring and the bolts tightened. The clamp can now be removed and the assembled commutator placed in a lathe and the face turned.

Welding Wide Tires

Give the tire the right lap without scarfing. Heat it red hot and clip off the edges with a sharp chisel. This is a



"Start with a Steady Blast"

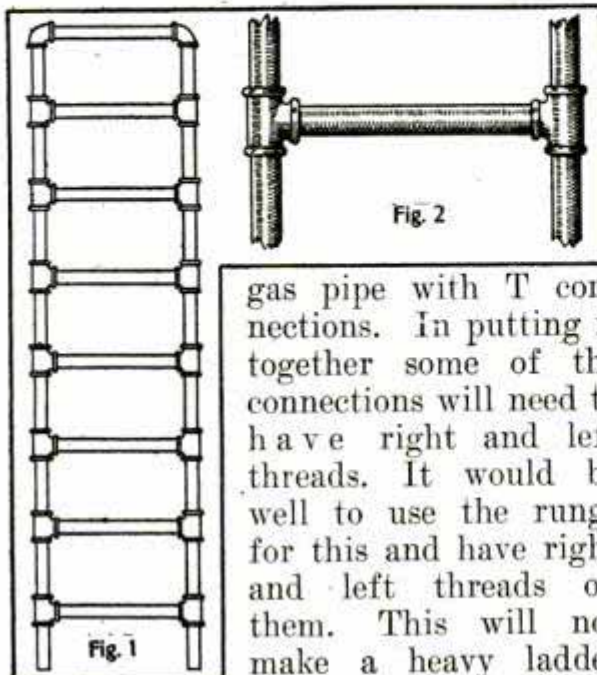
great deal quicker and better than scarfing with a fuller, says the *American Blacksmith*. Stand the tire up in the fire and place a fire brick on top of the scarfs. A common building brick will do as well, only it does not last as long as the fire brick. Start with a steady blast, and if you find the edges getting hot before the center, stop the blast a few moments until it shows the same heat all over, and then blow up again and you will get a good heat. Any wide iron can be welded in this way in one heat if there are two good hammermen that know their work. Let the edges spread out as much as they will and trim with a chisel. The main point is, do not hurry. Give a steady blast and do not force it; coax it.

To Drill Tempered Steel

Sometimes it is necessary to drill out parts of a broken tap which is hard to make a drill take hold of it. Keep the drill and steel wet with spirits of turpentine and the drill will bite, where at other times it would wear the cutting edge.—Contributed by Wm. Rosenblohm, Brooklyn, N. Y.

A Ladder Made of Gas Pipe

A light and durable ladder can be made of ordinary gas pipe and fittings, as shown in Fig. 1. Use about 1-in.

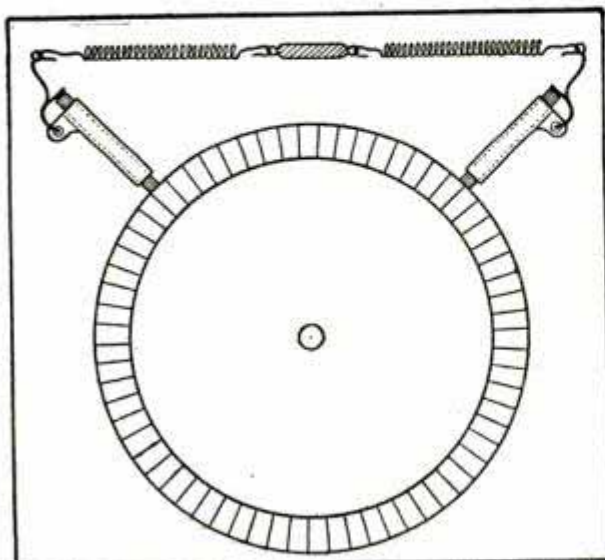


gas pipe with T connections. In putting it together some of the connections will need to have right and left threads. It would be well to use the rungs for this and have right and left threads on them. This will not make a heavy ladder

and is lighter than some of the usual wooden ones, and is, of course, fireproof.

Equalizing Brush-Holder Springs

Many commutator troubles may be overcome by equalizing the tension on the brush-holder springs, says a correspondent in *Electric Traction Weekly*. Connect the brushes in pairs, as shown in the sketch, by small coil springs, which will keep the tension on the two

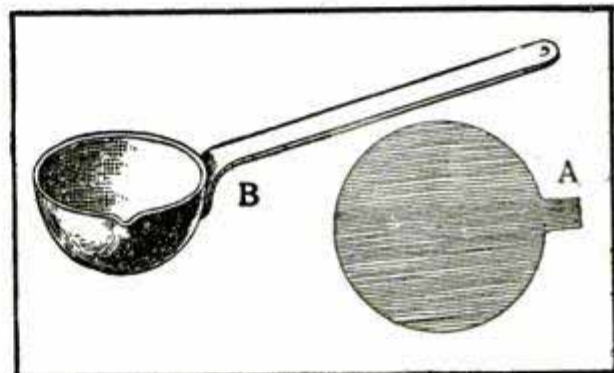


Equalizing Tension on Carbon Brushes

sets of brushes balanced and equalized. A small insulator should be placed in between the springs. This reduces the wear on the commutator and brushes, and will do away with grooves, rough places and burnt spots.

How to Make a Melting Ladle

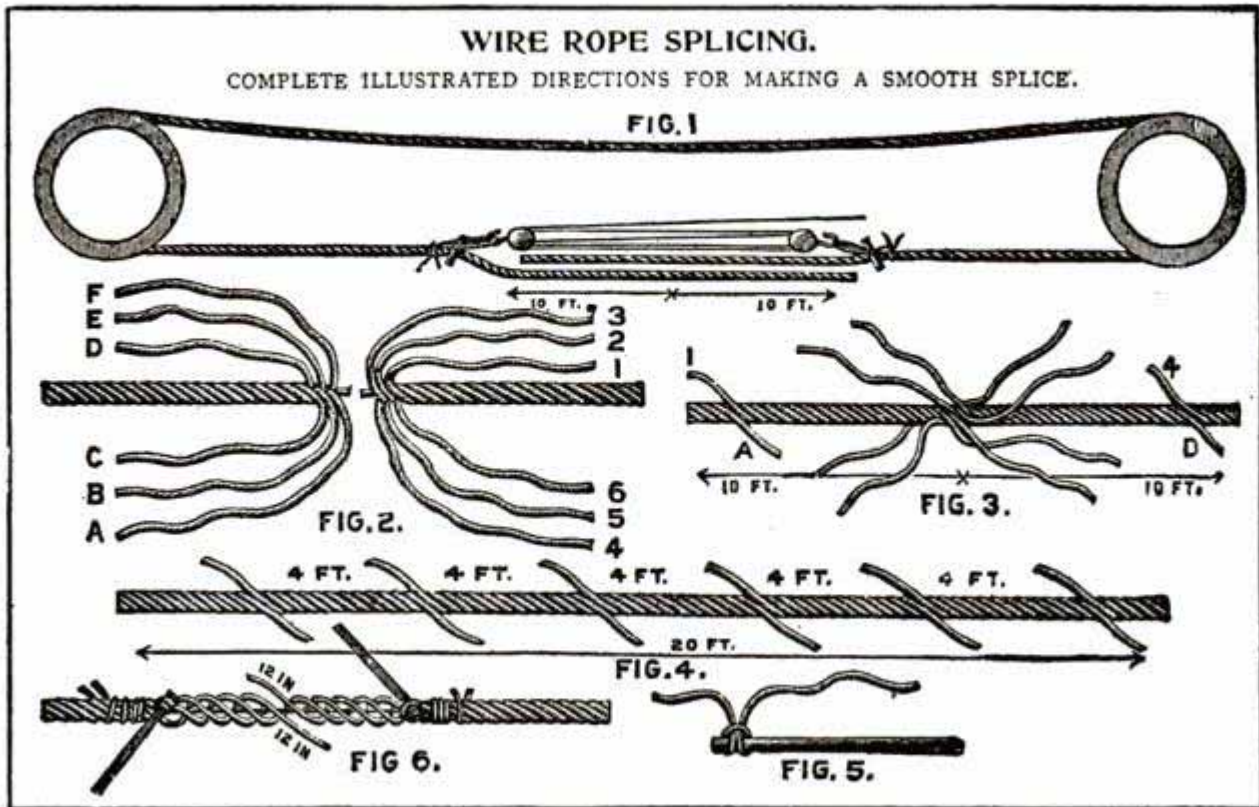
A ladle for melting lead or babbitt metal that is made of wrought iron will not break like one made of cast iron, says a correspondent in *The American Blacksmith*. A wrought iron ladle can be made by cutting a piece of flat iron or steel in the shape as shown in sketch at A from about $\frac{1}{4}$ -in. thick material. Weld or rivet a handle to this piece. Take a wide band about $1\frac{1}{2}$ in. smaller



Wrought-Iron Melting Ladle

than the piece cut for the ladle. If you do not have a band of this description, make one. Heat the piece from which you intend to make the ladle until it is red hot. Take a round-faced hand hammer, lay the flat piece on the band, and hammer it down until you have it in the shape of a ladle. It may take several heats to do this, for it all depends on the size of the ladle. When completed it should be in the shape as shown at B.

A cement that will resist white heat may be made of pulverized fire clay, 4 parts; plumbago, 1 part; iron filings or borings free from oxide, 2 parts; peroxide of manganese, 1 part; borax, $\frac{1}{2}$ part, and sea salt, $\frac{1}{2}$ part. Mix these to a thick paste and use immediately. Heat up gradually when first using.



Wire rope is susceptible of the most perfect splice; a better and smoother splice can be put in a wire rope than in any other kind of rope, for the simple reason that it is made with a view to this purpose. It has just the desired number of strands, namely, six, and a hemp core which provides place for fastening the ends. It is a plain, simple process, and but the work of an hour for anyone to learn.

In cases where an endless rope cannot be put on already spliced, the rope has to be put around the sheaves, hoisted taut by pulley blocks, and the splice made on the spot. See Fig. 1 in diagram of splices.

The necessary tools are a hammer and sharp cold chisel for cutting off ends of strands; a steel point or marlin spike for opening strands; two slings of tarred rope with sticks (see Fig. 5) for untwisting rope; a pocket knife for cutting the hemp core; a wooden mallet and block.

First—Put rope around the sheaves and heave it *tight* with good block and fall (see Fig. 1). The blocks should be hitched far enough apart so as to give room between to make a 20-ft. splice. A small clamp may be used to prevent the lashing from slipping

on the rope where the blocks are hitched (see Fig. 1). Next see that the ropes overlap about 20 ft., about 10 ft. each way from the center, as shown by the double arrow in Fig. 1. Next mark the center on both ropes with a piece of chalk, or by tying on a small string. Now proceed to put in the splice, with the blocks remaining taut, when necessary; but the better way is to remove the blocks, throw off the ropes from the sheaves, let it hang loose on the shafts, and proceed with the splice on the ground or floor, or scaffold, as the case may be.

Second—Unlay the strands of both ends of the rope for a distance of 10 ft. each, or to the center mark, as shown in Fig. 2. Next cut off the hemp cores close up, as shown in Fig. 2, and bring the bunches of strands together, so that the opposite strands will interlock regularly with each other (see Fig. 3).

Third—Unlay any strand, A, and follow it up with strand 1 of the other end, lay it tightly in the open groove made by unwinding A, make twist of the strand agree exactly with the twist of the open groove. Proceed with this until all but 12 in. of 1 are laid in, or till A has become 10 ft. long. Next

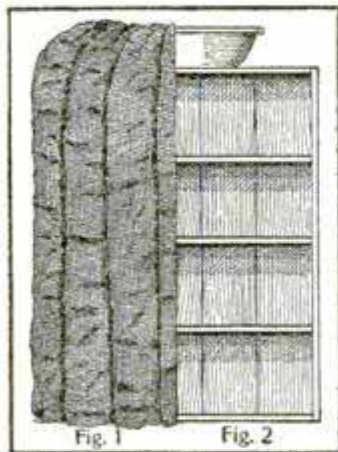
cut off A, leaving an end about 12 in. long.

Fourth—Unlay a strand, 4, of the opposite end, and follow with strand D, laying it into the open groove as before, and treating this precisely as in the first case (see Fig. 3). Next pursue the same course with B and 2, stopping 4 ft. short of the first set. Next with 5 and E, stopping as before. Then with C and 3; and lastly with 6 and F. The strands are now laid in with the ends 4 ft. apart, as shown in Fig. 4.

Fifth and last—The ends must now be secured without enlarging the diameter of the rope. Take two rope slings or twisters (see Fig. 5) and fasten to the rope as shown in Fig. 6; twist them in opposite directions, thus opening the lay of the rope (see Fig. 6). Next, with the knife cut out the hemp core about 12 in. on each side. Now straighten the ends, and slip them into the place occupied by the core, then twist the sling back, closing up the rope, taking out any slight inequality with a wooden mallet. Next shift the slings and repeat the operation at the other five places, and the splice is made.

Home-Made Cooler

A cooling device that will keep things cold can be made at little cost and will work well in any place. I have used one that kept food cold, say 55°, on the desert with heat registering by the

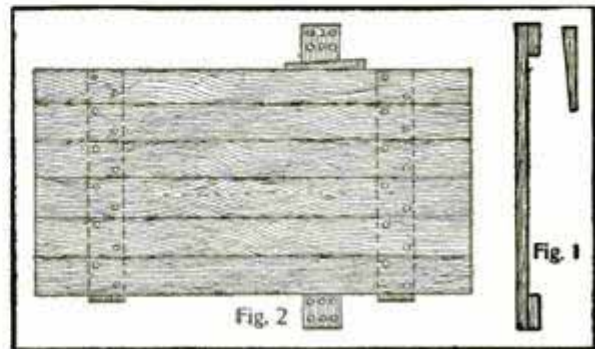


thermometer 115° to 120°. The frame may be made as high as you wish and to hold the required number of shelves, as shown in Fig. 2. Cover this over on all sides with burlap as shown in Fig. 1, leaving a part of the upper end of the burlap to lay in a pan of water which is placed on top of the frame. The burlap will absorb the wa-

ter, which will run down the sides, keeping the enclosed contents cool. It is necessary to change the water every morning.—Contributed by H. C. Mayer, Venice, Cal.

Quickly Made Carpenter's Clamp

This is a handy device if anyone has a door to make or any cabinet work where tools are scarce. Take a board of sufficient length and nail a cleat on both ends, as shown in Fig. 1. The space



Clamp for Cabinet Work

between the cleats should be of a width that will just take in the door or cabinet work. The wedge is then driven in as shown in Fig. 2, which holds the boards together until they are nailed to the batten pieces or glued in cabinet work.

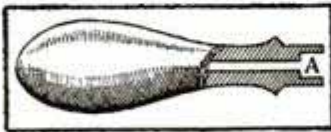
Annealing Novo Steel

If you have a piece of novo high speed steel and wish to soften it so it can be worked, take a barrel of slacked lime, and a piece of gaspipe about an inch larger in diameter and two or three inches longer than the steel you wish to anneal. Thread the pipe on both ends and fit a cap on one end, then put in about an inch of lime, drop in the steel and pack well with lime, keeping the steel in the middle of the pipe, and fill the other cap with lime and screw it on the other end. Put the pipe and its contents in the fire and heat slowly and evenly to a white, but not melting, heat and then take it out and quickly bury it in the middle of your barrel of lime and leave

it for 12 or 14 hours. For ordinary sized pieces the time taken to heat will not be over 20 minutes and if a good sized forge is used, it will be considerably less. Be sure it is heated through before putting it in the lime barrel.—Contributed by E. V.

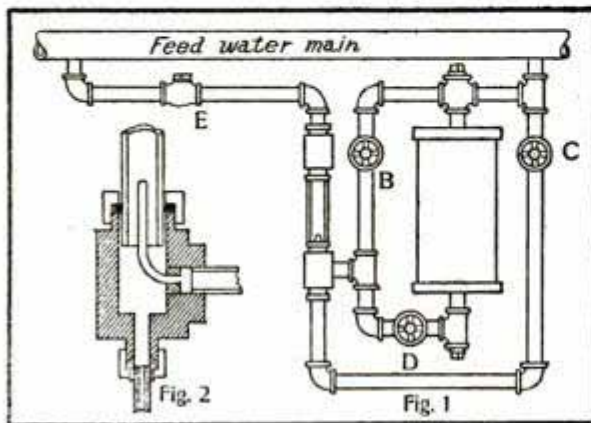
Wood Handle Without a Metal Ferrule

Make the handle the shape desired and bore a $\frac{1}{2}$ -in. hole about $\frac{1}{2}$ in. deep in the end where the tool is to be inserted. Continue the hole to the required depth with a $\frac{1}{4}$ -in. bit or drill. The rim of the larger hole, A, as shown in the sketch, serves as a ferrule and will keep the wood handle from splitting.—Contributed by W. C. Loy, Rochester, Ind.



How to Make a Boiler Compound Feeder

The accompanying sketch shows a type of boiler compound feeder which depends for its action on the drop in pressure between two points in the feed water main to which it is connected, being evident that the greater the distance apart the points of connection are made the greater will be the tendency of the flow of feed water to follow the path offered through the feeder. The arrangement has the advantage of increasing the rate or amount of compound feeding to the boilers when the feed water being delivered to the boiler



Compound Boiler Feed

is increased and *vice versa*, which tends to give automatic control within certain limits.

The difficulty of securing sight feed in handling boiler compounds has been overcome in this feeder in an ingenious manner and constitutes the improvement for which originality is claimed. Referring to the sketch, it will be seen that opening the valve C admits a flow of water which passes around the feeder and up through the glass, giving an independent circulation that maintains a clear view of the jet from which the boiler compound is flowing. The action prevents any coloring matter, used in mixing the compound, from diffusing, as the rapid circulation carries it beyond the jet before it has had time to blend with the circulating water.

The usual soda compounds are made more effective when a small quantity of tannic acid is used, as results from adding logwood during the period of dissolving the soda crystals, giving the solution a dark amber color that when feeding gives the appearance of a miniature column of smoke issuing from the jet. A mixture of this character will be heavier than water and should be fed from the bottom through valve D. A compound lighter than water may be fed equally as well by closing valve D and opening valve B.

The use of the check valve E is for the purpose of retarding the rebound of the water, due to the pump action, which would otherwise cause the water to surge in the glass, preventing a steady feed.

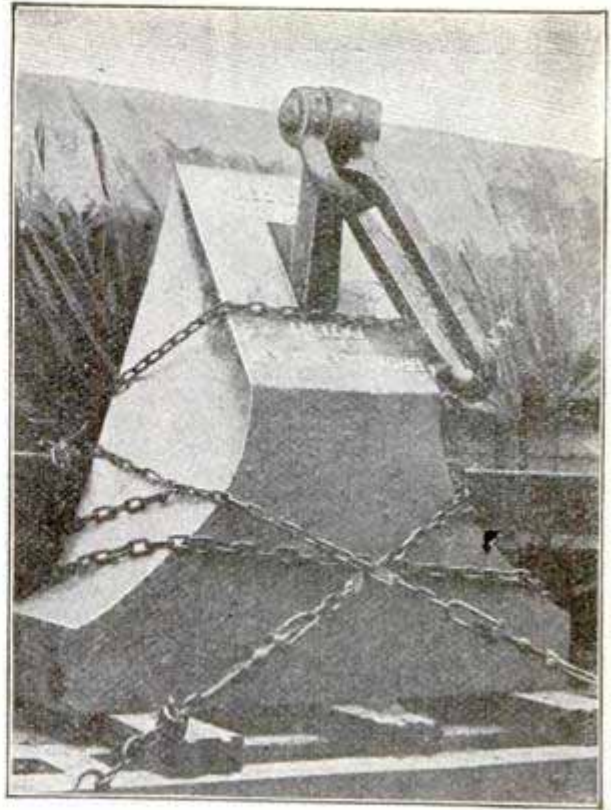
Fig. 2 shows an enlarged cross-section of the part where the compound comes in contact with the feed water.—Contributed by C. Everett Smith, Baltimore, Md.

In treatment of burns the main thing is exclusion of air and keeping the skin soft with some unguent. White of eggs beaten while castor oil is poured in until a thick creamy paste is formed makes a good application which is easily prepared.

GREAT CHAINS FOR SHIPS

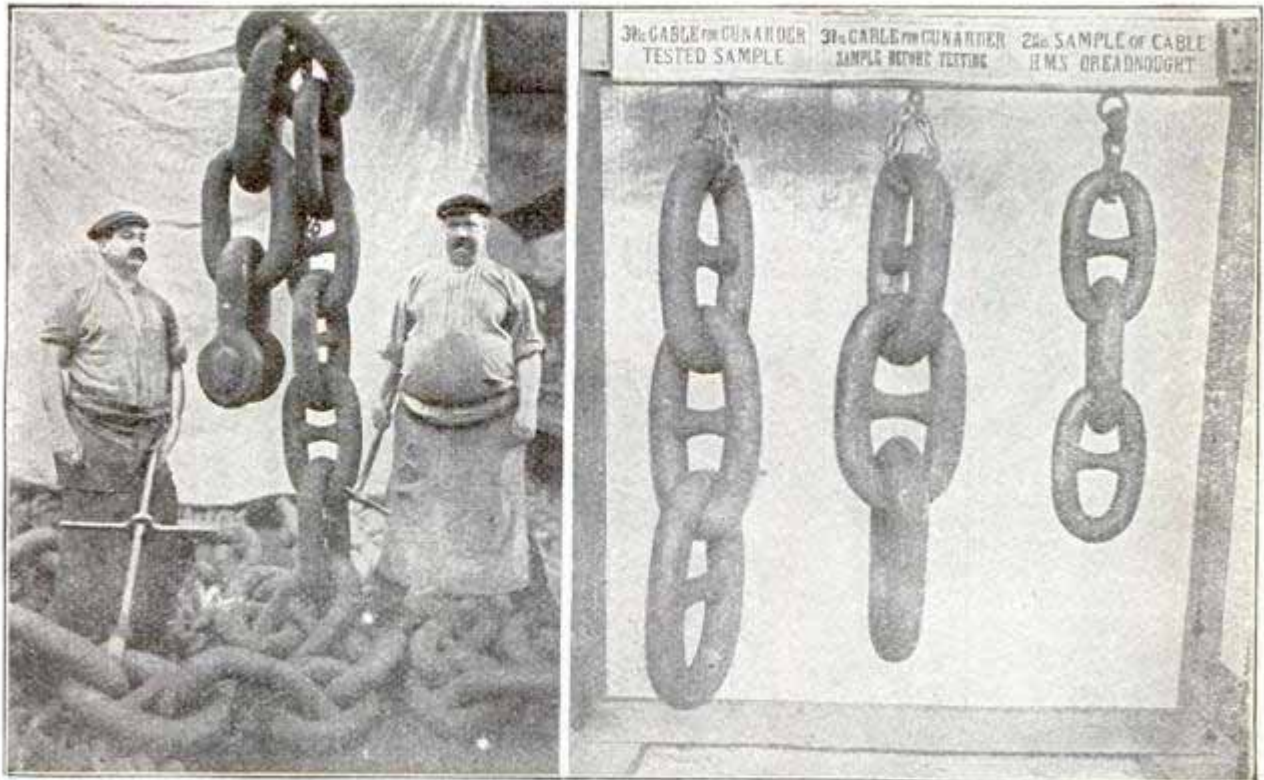
For mooring the "Lusitania" and "Mauretania" in the River Mersey 12-ton anchors are used and the mooring weighs over 200 tons. The four bridle chains are 750 ft. long. Square links are used in the construction of the main chain, each weighing 400 lb., and measuring 4 ft. in length. The swivel connection for the bridle chains weighs 4,485 lb., and the shackles 711 lb. each. The buoy pendant is constructed of iron $4\frac{1}{4}$ and $5\frac{3}{8}$ in. in diameter.

These links were tested to destruction by a powerful machine built to test chains of the largest size. Each link elongated $\frac{1}{4}$ in., under the Admiralty proof strain of 198.8 tons. There was a further stretching of $\frac{3}{4}$ in., when the statutory breaking stress of 267.7 tons was applied. The links then stood a test of over 370 tons actual tension without breaking, the full power of the testing machine. Although the strain was above the Admiralty proof stress by nearly 100 tons no defect or sign of fracture was noted. These chains were constructed at Pontypridd, Eng., by the British Admiralty contractors.



12-Ton Anchor

The cables of the "Dreadnought," although the largest battleship afloat, are much smaller, the metal being only $2\frac{1}{16}$ in. in diameter. The accompanying illustrations show the construction and size of the "Mauretania's" cable links compared with the height of a man.

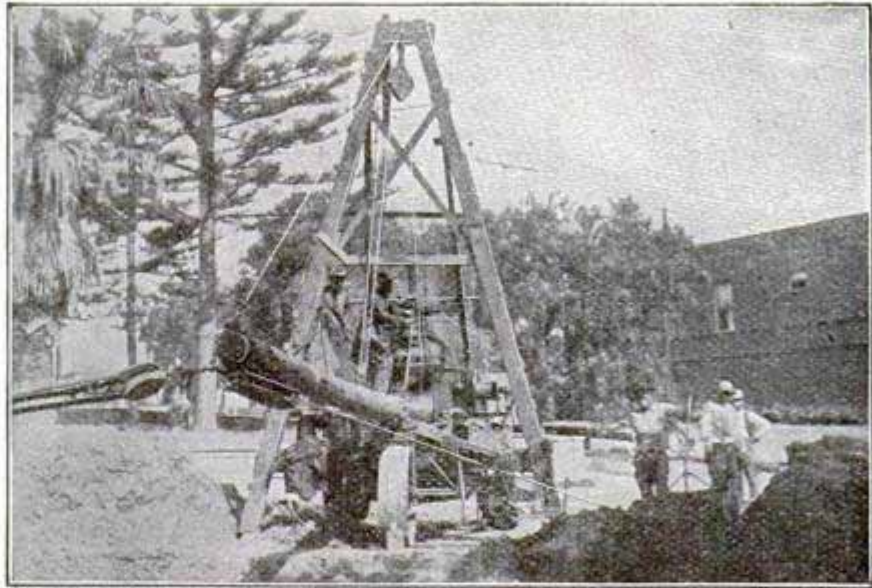


A Pull of 370 Tons Failed to Break These Chains

BACK-FILLING WITH PORTABLE ENGINE

This machine is a mechanical jack of all trades. At the time the photograph was taken it was engaged on a contract for back-filling a ditch 10 ft. deep, 8 ft. wide and 3,000 ft. long. The portable plant includes an upright boiler and 15-hp. engine. It has a traction drive for propelling itself, and several winding drums, a derrick and boom.

On this particular job the boom reaches across the deep ditch immediately in front. The rope to the left holds the boom in place, while a small wire rope pulls the scraper containing about $\frac{1}{4}$ yd., into the ditch. Another small wire rope, running through the pulley at the curb back of the last man, pulls the scraper back again. It goes much quicker than it takes to tell. The arrangement is the idea of a contractor in California where the machine is in use.



Economical Method of Filling

continuously, and the sound perfectly audible on all sides of the shadow.

In many instances the cause of a sound shadow can easily be discovered. The existence of a bluff behind the whistle sometimes makes the sound waves ricochet in a bounding manner over the water, perfectly audible at say one mile, inaudible at two miles, and distinctly heard again at three miles. It is impossible to trace the origin of many sound shadows because they are doubtless due to some peculiar condition of the atmosphere.

SOUND SHADOWS IN FOG DANGEROUS TO NAVIGATION

Repeated experiments by the government have proven that sound in fog is erratic, and that mariners run a grave peril when they trust to fog signals alone when navigating dangerous coasts.

The reason for this ungentlemanly behavior of sound is designated as "sound shadows," within which the



Sound Waves Ricochet

LONG-DISTANCE CONTROL OF MECHANISM

The control at a distance of death-dealing machines of war, such as mines and torpedoes, may become practical, if the work of inventors on an ingenious system of controlling mechanisms by wireless bears fruit.

A demonstration has been given which proves that any number of actions can be controlled but not perfectly, because only one action can be controlled at a time. This is accomplished by driving two series of distributing switches in synchronism, one at the control station and the other at the station where the controlled mechanisms are. The switch at the receiving sta-

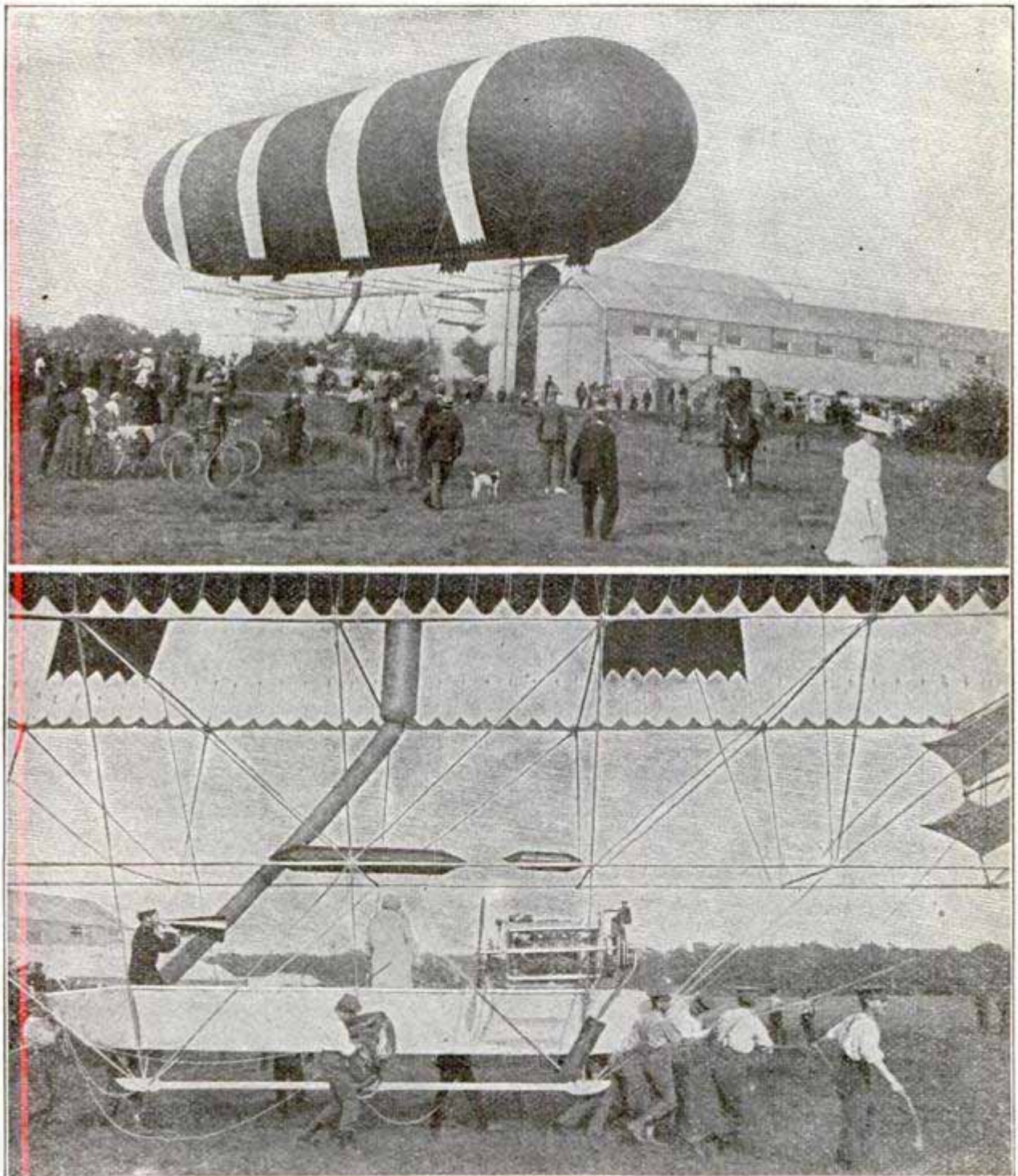
ear detects no trace of the signal, although the whistle may be blowing

tion closes one after the other of the circuits controlling different actions. During this period it is possible, by sending an electrical wave from the control station, to close a relay in that particular circuit, which closes the circuit of the local controlling mechanism. An indispensable feature of the system is an automatic return signal given when the mechanism has completed the desired operation.

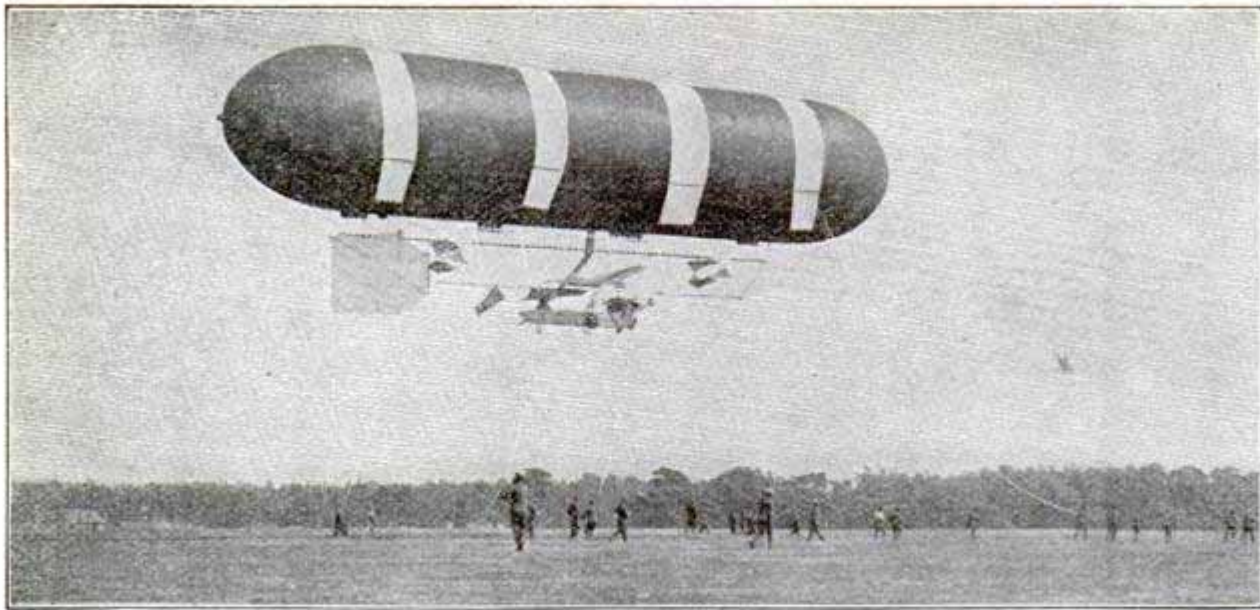
ENGLAND'S FIRST MILITARY AIRSHIP A SUCCESS

**Sails Against the Wind—Answers Helm Well—
Aerial War Machines Not Immune
to Artillery**

The recent successes of French and German airships has at last awakened England to the great importance of these weapons of modern warfare, and for the moment her interest has been



English War Balloon Ready for Flight—Note Pipe Conducting Exhaust Gas to Bag



The Gas Bag is 100 Ft. Long and 30 Ft. in Diameter

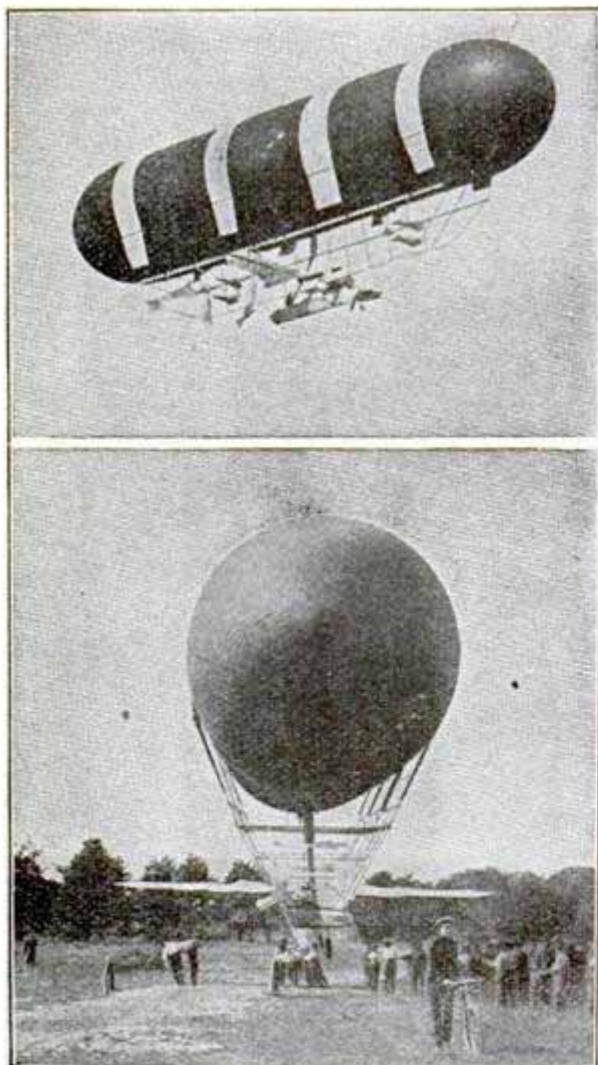
diverted from "Dreadnoughts" and other mighty marine war machines by the highly successful trials of the first airship ever constructed by the English army.

Two trials have been made in which the airship has proved itself capable of being handled easily with or against the wind, and to answer its helm satisfactorily. In the second trial a semicircle of two miles was navigated and then an accident occurred to the engine which made it necessary to descend to the ground. The defect was only slight and easily remedied. During the trip the wind blew at a rate of 15 miles an hour, but the airship had no difficulty navigating against it at a speed of 5 miles an hour, rising and falling gently like a vessel in a seaway.

The English airship is a dirigible balloon, 100 ft. long by 30 ft. in diameter and shaped like a sausage. The gasoline for the motors is carried in two torpedo-like cylinders above the car. The exhaust vapor from the engines—a hot gas—is carried up into the balloon by means of a tube, so arranged as to avoid any danger of a spark from the engines entering the immense bag and causing a fatal explosion.

The ship has a lifting capacity of one ton, which, after deducting the weight of the car, engines and other apparatus, permits the carriage of a crew of three men of average size.

An artillery corps on another part of the English isle has been busy learning how to destroy war airships, by knocking holes in balloons three miles distant and 1,200 ft. up in the air.



This Ship Can Raise One Ton

CONCRETE CONSTRUCTION FOR STOCKYARDS

Reinforced concrete is being rapidly substituted throughout the maze of platforms, chutes and runways at the Chicago stockyards in place of the old woodwork which made that section so liable to fires. An immense platform 1,300 ft. long has just been entirely rebuilt. Electric light wires will be run through tubes imbedded in the concrete, making fire from this source impossible.

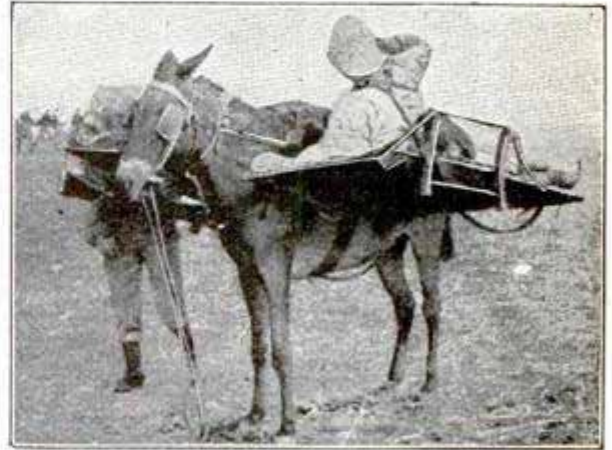
"LUSITANIA" FAILS TO BREAK TRANS-ATLANTIC RECORD ON MAIDEN TRIP

The "Lusitania," queen of the seas, heralded as the greatest ship afloat, has made her maiden voyage. Although she now holds the record between Liverpool and New York, the trans-Atlantic speed laurels still remain with her big German rivals, the "Deutschland" and "Kaiser Wilhelm II."

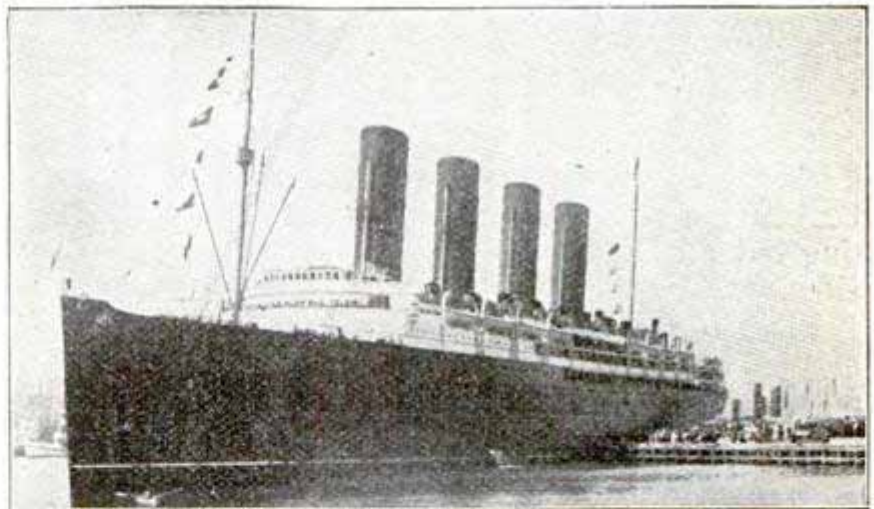
This mammoth turbine ship, the largest vessel in the world, left Liverpool at 8 o'clock Saturday night, Sept. 7, and arrived off Sandy Hook at 8 o'clock Friday morning, Sept. 13, having reduced the record from Queenstown, which is on the coast of Ireland, by 6 hours, 29 minutes. Her fastest daily run was 593 miles, 8 miles less than the run of 601 miles logged by the "Deutschland." The turbines worked to perfection, not the merest accident marring the voyage.

Despite the fact that the turbine ship has not wrested all the speed records of the sea from her older rivals, it was generally admitted that her performance was remarkable for a maiden voyage and that she will develop speed enough, when her engines are thoroughly tried out, to carry everything

before her. To do this she must establish a record of more than 23 miles an hour on the westward trip, held by the "Deutschland," and more than 23 miles an hour on eastward trip, held by the "Kaiser Wilhelm II."



CURIOUS FRENCH AMBULANCE.—This picture was taken under fire during one of the battles before Casa Blanca for the Illustrated London News. It shows the type of field ambulance, accommodating two men. In this instance the near pannier contains a wounded Legionary, while the off pannier holds the body of a dead soldier.



"Lusitania" at New York, Sept. 13

The management of the Chicago and Northwestern Railroad is experimenting with a German speedometer, placed in one of the cars instead of on the engine, which not only records the speed the train makes, but also records all stops and their duration. The purpose of the new speedometer is to educate engineers to try for smoother runs and also to incite train and station crews to faster work at stations.



Amateur Mechanics



HOW TO MAKE SILHOUETTES

Photography in all branches is truly a most absorbing occupation. Each of us who has a camera is constantly experimenting, and every one of us is delighted when something new is suggested for such experiments.

To use a camera in making silhouettes select a window facing north if possible, or if used only at times when the sun is not on it, any window will do, says the *Photographic Times*. Raise the window shade half way, remove any white curtains there may be, and in the center of the lower pane of glass paste by the four corners a sheet of tissue paper that is perfectly smooth and quite thick, as shown in the sketch at B. Darken the rest of the window, shutting out all light from above and the sides.

Place a chair so that after being seated the head of the subject will come before the center of the tissue paper, and near to it as possible, and when looking straight before him his face will be in clear profile to the camera.

Draw the shades of all other windows in the room. Focus the camera carefully, getting a sharp outline of the profile on the screen. Do not stop down the lens, as this makes long exposure necessary, and the subject may move.



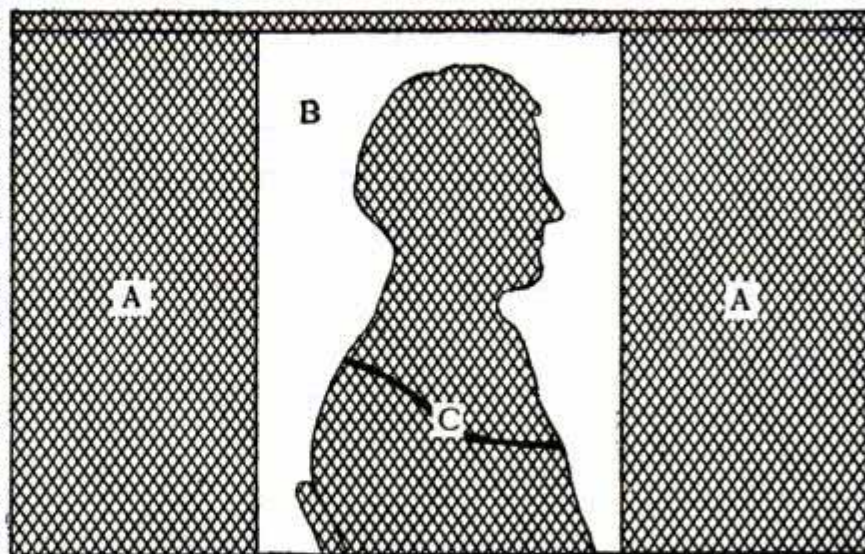
Correct exposure depends, of course, on the lens, light and the plate. But remember that a black and white negative is wanted with as little detail in the features as possible. The best plate to use is a very slow one, or what is called a process plate.

In developing get all possible density in the high lights, without detail in the face, and without fog. Printing is best done on contrasty development paper with developer not too strong.

The ideal silhouette print is a perfectly black profile on a white ground. With a piece of black paper, any shape in stopping off print may be made as shown at C in the sketch.

HOW TO CROSS A STREAM ON A LOG

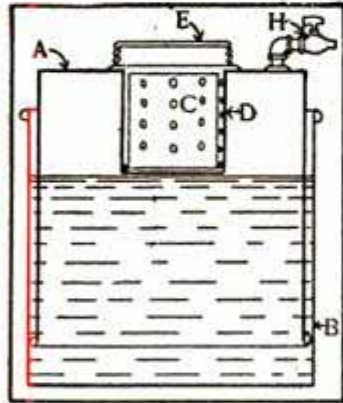
When crossing a water course on a fence rail or small log, do not face up or down the stream and walk sideways, for a wetting is the inevitable result. Instead, fix the eye on the opposite shore and walk steadily



forward. Then if a mishap comes you will fall with one leg and arm encircling the bridge.—C. C. S.

A HOME-MADE ACETYLENE GAS GENERATOR

A simple acetylene gas generator used by myself for several years when



out on camping trips was made of a galvanized iron tank, without a head, 18 in. in diameter and 30 in. deep, B, as shown in the sketch. Another tank, A, is made the same depth as B, but its diameter is a little smaller, so that inverted it will just slip easily into the tank B. In the bottom, or rather the top now, of tank A is cut a hole and a little can, D, is fitted in it and soldered. On top and over can D is soldered a large tin can screw. A rubber washer is fitted on this so that when the screw top, E, is turned on it, the joint will be gas-tight. Another can, C, which will just slip inside of the little can, is perforated with a number of holes. This can C is filled about half full of broken pieces of carbide and then placed in the little can D. A gas cock, H, is soldered on to tank A, as is shown, from which the gas may be taken through a rubber tube. Fill tank B with water and set tank A into it. This will cause some air to be inclosed, which can be released by leaving the cock open until tank A settles down to the point where the water will begin to run in the perforations of the little tank. The water then comes in contact with the carbide and forms gas, which expands and stops the lowering of tank A. Then the cock must be closed and tubing attached. It is dangerous to attempt to strike a match to light a jet or the end of the cock while air is escaping and just as the first gas is being made. Wait until the tank is well raised up before doing this.—Contributed by James E. Noble, Toronto, Ont.

HOME-MADE DISC RECORD CABINET

Select some boards that have a nice grain that are about 1 in. thick and 12 in. wide. Cut the end pieces each 36 in. long and trim down the edges so as to make them $11\frac{3}{8}$ in. wide. The top board is made 28 in. long and full 12 in. wide. The three shelves are cut 25 in. long and the edges trimmed so they will be $11\frac{3}{8}$ in. wide. The distance between the bottom of the top board and the top of the first shelf should be 3 in. Two drawers are fitted in this space as shown in Fig. 1. A series of grooves are cut $\frac{1}{4}$ in. wide, $\frac{1}{4}$ in. deep and $\frac{3}{4}$ in. apart on one side of the top and bottom shelves, as shown in Fig. 2, and on both sides of the middle shelf. The shelves should be spaced $9\frac{5}{8}$ in. for 10-in. records and $5\frac{5}{8}$ in. for 6-in. records. A neat scroll design is

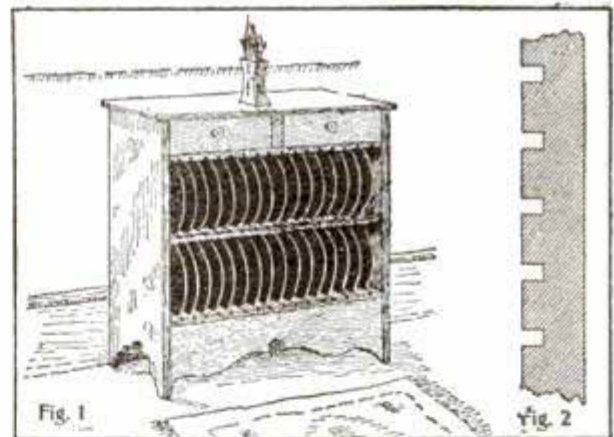


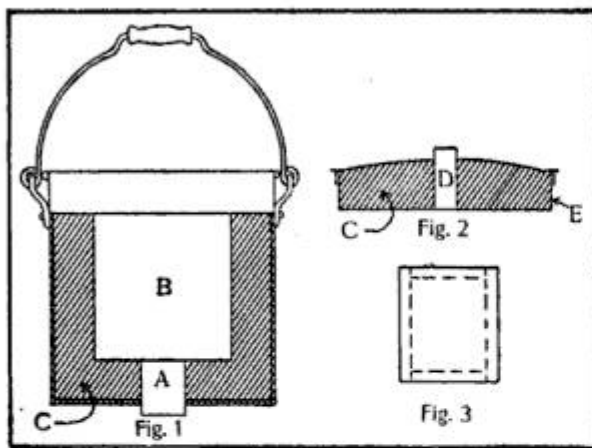
Fig. 1 Holds 32 Records

cut from a board 25 in. long to fill up and finish the space below the bottom shelf.—Contributed by H. E. Mangold, Compton, Cal.

HOME-MADE POTTERY KILN

A small kiln for baking clay figures may be built at a cost of \$1. The following shows the general plan of such a kiln which has stood the test of 200 firings, and which is good for any work requiring less than 1400° C.

Get an iron pail about 1 ft. high by 1 ft. across, with a cover. Any old pail which is thick enough will do, while a new one will cost about 80



Home-Made Pottery Kiln

cents. In the bottom of this cut a 2-in. round hole and close it with a cork or wood plug, A, Fig. 1, which shall project at least 2 in. inside the pail. Make a cylindrical core of wood, B, Fig. 1, 8 in. long and 8 in. across. Make a mixture of clay, 60%; sand, 15%; and graphite, 25%, kneading thoroughly in water to a good molding consistency. Line the pail, bottom and sides, with heavy paper and cover the core with same. Now pack the bottom of the pail thoroughly with a 2-in. layer of the clay mixture, and on it set the paper-wrapped core, carefully centering it. The 2 in. of space between the core and the sides of the pail all around is to be filled with clay, C, as is shown in the sketch, using a little at a time and packing it very tight. In like manner make the cover of the kiln, cutting the hole a little smaller, about 1 in. At the edge or rim of the cover encircle a 2-in. strip of sheet iron, E, Fig. 2, to hold the clay mixture, C. Set aside for a few days until well dried.

While these are drying you can be making a muffle, if there is to be any glazing done. This is a clay cylinder (Fig. 3) with false top and bottom, in which the pottery to be glazed is protected from any smoke or dust. It is placed inside the kiln, setting on any convenient blocks which will place it midway. The walls of the muffle should be about $\frac{1}{2}$ in. thick, and the dimensions should allow at least 1 in. of space all around for the passage of heat between it and the walls of the kiln. By the time the clay of the kiln

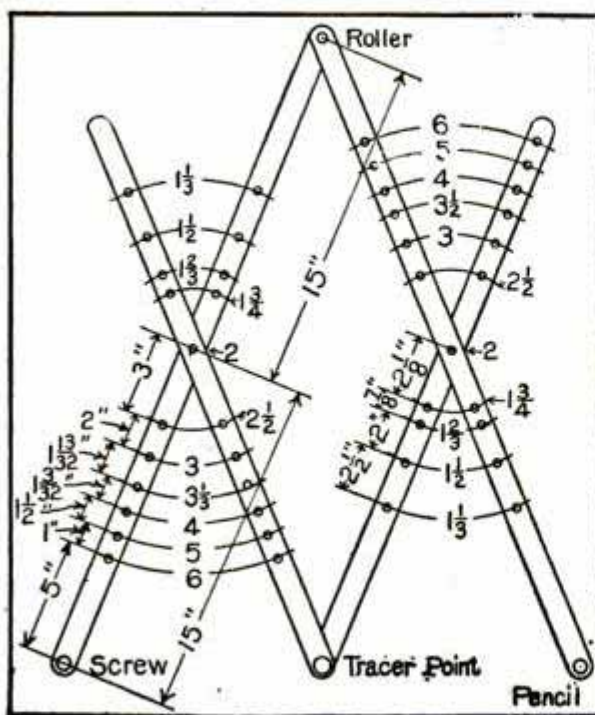
is well dried, it will be found that it has all shrunk away from the iron about $\frac{3}{8}$ in. After removing all the paper, pack this space—top, bottom and sides—with moist ground asbestos. If the cover of the pail has no rim, it may be fastened to the asbestos and clay lining by punching a few holes, passing wire nails through and clinching them. Fit all the parts together snugly, take out the plugs in the top and bottom, and your kiln is ready for business. The handle of the pail will be convenient for moving it about, and it can be set on three bricks or some more elaborate support, as dictated by fancy and expense.

The temperature required for baking earthenware is 1250°-1310° C.; hotel china, 1330°; hard porcelain, 1390°-1410°. These temperatures cannot be obtained in the above kiln by means of the ordinary Bunsen burner. It will be necessary either to buy the largest size Bunsen, or make one yourself, if you have the materials. If you can get a cone which can be screwed into an inch pipe, file the opening of the cone to $\frac{1}{16}$ in. diameter, and jacket the whole with a 2½-in. pipe. The flame end of this burner tube should be about 4½ in. above the cone opening and should be covered with gauze to prevent flame from snapping back. When lighted, the point of the blue flame, which is the hottest part, should be just in the hole in the bottom of the kiln. Such a burner will be cheaply made and will furnish a kiln temperature of 1400°, but it will burn a great deal of gas.

A plumber's torch of medium size will cost more in the beginning, but will be cheaper in operation. Whatever burner is used, the firing should be gradual, and with especial caution the first time. By experiment you will find that a higher temperature is obtained by placing a 1-in. pipe 2 ft. long over the lid hole as a chimney. It would be still more effective to get another iron pail, 2 in. wider than the kiln, and get a down draft by inverting it over the kiln at whatever height proves most suitable.—G. L. W.

HOW TO MAKE A PANTOGRAPH

Secure four pieces of wood, from which cut and dress down to $\frac{3}{16}$ in. by $\frac{3}{4}$ in.; make two of them 31 in. long and the other two 24 in. long. These pieces of wood may be of any material, but it is best to make them of some hard wood. The "screw" in the sketch is a screw-eye long enough to pass through the arm and an old silk spool. This will keep the arms up from the board or table so as to allow a point at tracer point and pencil to be a little above the work. At tracer point a round-headed brass wood screw is used which is filed to a point and slightly rounding so it will not scratch. A lead pencil is sharpened and fitted in a hole marked "pencil." At point marked "roller" a screw-eye is put in from underneath to allow a rounding edge for this point to rest. The small holes on all arms are marked on the left from $1\frac{1}{3}$ to 6 and on the right from 6 to $1\frac{1}{3}$. When matched and clamped with a screw-eye will enlarge sketch or pattern from tracer point to the size of holes that are numbered in the semi-circle. If holes marked $1\frac{1}{3}$ on left are matched and holes $1\frac{1}{3}$ on right are matched then it will increase the size of the drawing $1\frac{1}{3}$. If No. 6 on the

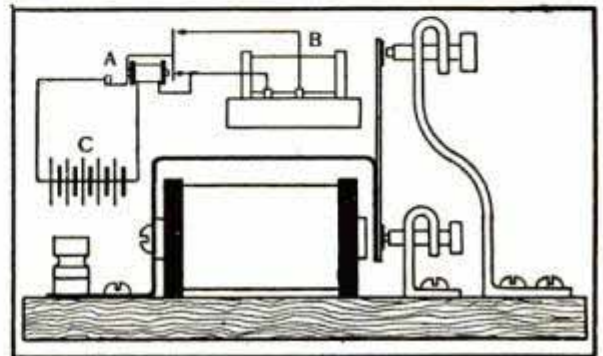


Home-Made Pantograph

left and No. 6 on the right are matched then the increase will be 6 times. The distance the holes are made one from the other is shown with the figures and inch marks.—Contributed by E. W. Bowen, Denver, Colo.

CIRCUIT BREAKER FOR INDUCTION COILS

Amateurs building induction coils are generally bothered by the vibrator contacts blackening, thus giving a



Interrupter for Induction Coil

high resistance contact, whenever there is any connection made at all. This trouble may be done away with by departing from the old single contact vibrator and using one with self-cleaning contacts as shown. An old bell magnet is rewound full of No. 26 double cotton-covered wire and is mounted upon one end of a piece of thin sheet iron 1 in. by 5 in. as per sketch. To the other end of the strip of iron is soldered a piece of brass 1-64 in. by $\frac{1}{4}$ in. by 2 in., on each end of which has been soldered a patch of platinum foil $\frac{1}{4}$ in. square.

The whole is connected up and mounted on a baseboard as per sketch, the contact posts being of $\frac{1}{16}$ in. by $\frac{1}{2}$ in. brass, bent into shape and provided with platinum tipped thumb screws. The advantage of this style of an interrupter is that at each stroke there is a wiping effect at the heavy current contact which automatically cleans off any carbon deposit.

In the wiring diagram, A is the circuit breaker; B, the induction coil, and C, the battery.—Contributed by A. G. Ward, Wilksburg, Pa.

HOW MEN MAKE BIG SALARIES

By PROSPER WELLES

The Story of Workers Who Make Their Work Pay Big Dividends—Who Wanted More Salary and Got It

Does your work pay?

Not just day wages, but a good, round, stiff salary?

If not, why don't you make it pay?

You see men about you who earn dollars where you earn dimes, yet they work no harder than you.

What makes the difference? Luck?

Not often. What then?

In one word—**training.**

To illustrate: Wilson P. Hunt, of Moline, Ill., was employed as a machinist's apprentice and was 20 years of age when he was, like you, endeavoring to work out the success proposition. He enrolled in the I. C. S. as the most practical means of doing this, and on finishing his Course he became draftsman, then a machine designer, and later started the Moline Tool Company, becoming Secretary and Superintendent of the concern.

His earnings were, of course, very greatly increased.

Another man who wanted more salary and got it by following out the definite I. C. S. plan is H. E. Mack, Board of Trade Building, Boston, Mass. Mr. Mack became an I. C. S. student when he was a shop hand in a telephone factory and was supplied with but very little schooling. Telling his experience in his own words, Mr. Mack says: "Your Course provided the knowledge that has enabled me to steadily advance to my present position as New England Manager for the firm of Pilling & Crane, Commission Merchants in iron,



Wilson P. Hunt



FROM APPRENTICE TO PROPRIETOR

steel, coke, ores, and cement. When I began my Course my wages were about \$6 per week. My earnings are now over five times as much and I have just refused an offer of \$2,000 per year."

Just read the story of success that the I. C. S. has made possible for E. A. Bostrom, of Atlanta, Ga. Mr. Bostrom came to this country some years ago an unskilled Scandinavian. For some time he worked at various trades doing the best he could, but found advancement very slow on account of his lack of technical knowledge. When he heard of the International Correspondence Schools he saw his opportunity and decided to enroll at once. The training he received enabled him to steadily advance

and secure a position as foreman and then superintendent of the machine shop in which he was working when he enrolled. He then invented a builder's level on which he secured three patents. He succeeded in interesting capital in his invention and resigned his position to become President of his own

Company. Mr. Bostrom says: "We are now doing well and have sold several thousand instruments which have given perfect satisfaction. Your system is a blessing to the working people." Mr. Bostrom will certainly never regret the day he enrolled in the I. C. S., and there are thousands of others who can say the same. One of this number is G. A. Collins.

An Increase of 1,000 Per Cent.

How Mr. Collins made his work pay would read like romance if it were not an actual fact. Mr. Collins was a chainman with a Railroad Maintenance of Ways

Department at the time of enrolling with the I. C. S. After a few months he was promoted to rodman and then to transitman, but still he was dissatisfied; he wanted to lead instead of being led. Consequently he established an office of his own as Civil Engineer and became in addition Chief Engineer of a large coal company. Now, he says: "My earnings have been increased during this time nearly one thousand per cent., and I can recommend your institution to any ambitious, earnest man. The I. C. S. is certainly a wonderful institution."

A thousand per cent. is pretty fair return on the small investment required for an I. C. S. Course, isn't it? Mr. Collins' address is 717 N. Y. Block, Seattle, Wash.

Yet there are many men who believe that success is a matter of mere "luck," that the successful man is one who has been lucky enough to have fine opportunities thrust upon him that any man could have taken advantage of if they had been so untrusting upon him. This is not true.

Success Comes From Definite Planning

The successful man of today is he who in the past prepared himself to seize opportunities as they presented themselves. Thus, the real "secret" of success lies in being prepared for it. A good instance of this lies in the experience of H. Gearing, 14 Leader Lane, Toronto, Ont.

Mr. Gearing states his case as follows: "I had always aimed for the position I now hold, and although I would likely have attained the same if I had not taken

my Course it would be very much like a man walking to the top of a twenty-story building instead of taking the elevator." Mr. Gearing's Course enabled him to take advantage of his opportunities as fast as they came along, and his promotion was accordingly rapid. He enrolled when he was working as an elevator man. He is now one of the most competent mechanical experts of his city and recently refused an offer of \$3,000 per year from a Chicago firm.

Another man who followed out a definite system of training for success is Earl D. Sturrock, Box 461, Port Townsend, Wash. When Mr. Sturrock enrolled in the I. C. S. he knew nothing whatever about machinery of any kind and was working in a printing office earning perhaps \$30 a month. The knowledge he gained from his Course enabled him to enter the electrical profession, and he is now Proprietor of

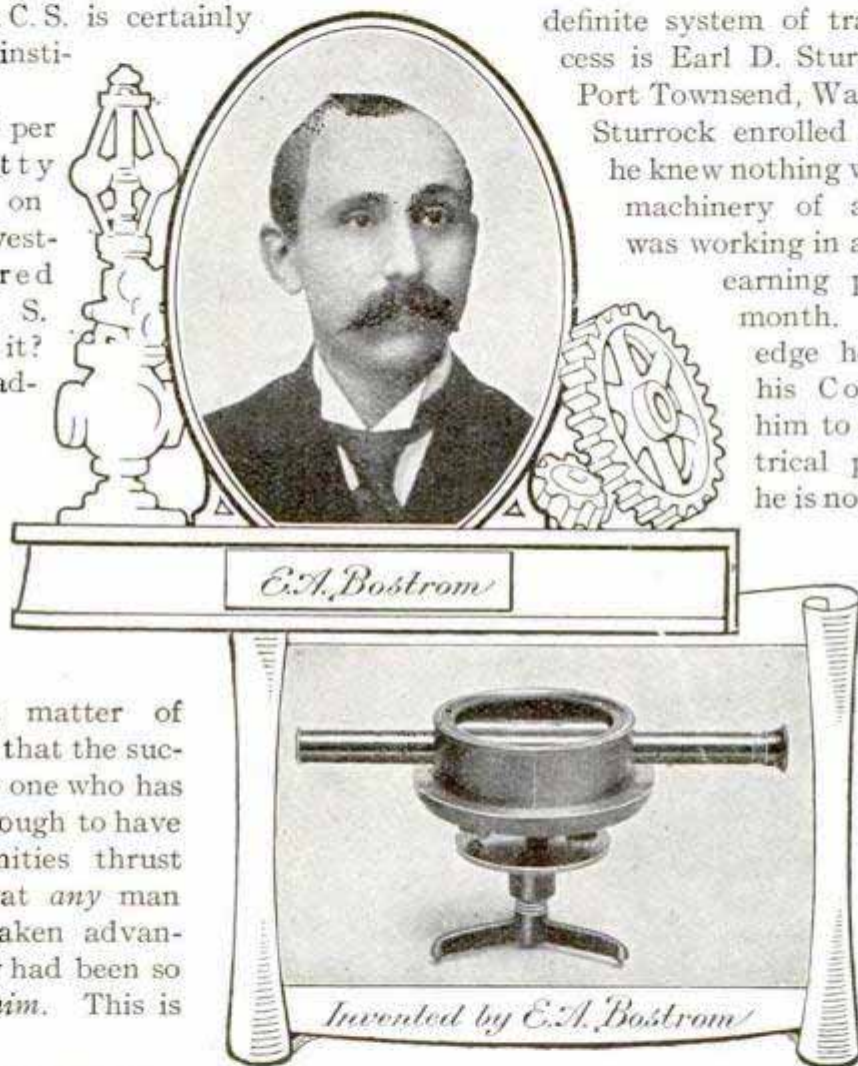
the Pacific Electric Company, with earnings reaching anywhere from \$150 to \$200 a month.

It is surprising to note the objections that some people raise to the I. C. S.

system of training. This is especially remarkable when fair consideration shows it to be the most practical way in the world for promotion to better positions and earnings.

No Difficulties for the Truly Ambitious

Some say they have not the time or money, and others state that their previous education debars them from gaining any understanding at all of the study of such mathematical problems, etc. as are necessary to qualify them for the higher positions in the



technical fields. But these very persons are generally those that have far fewer difficulties to overcome than hundreds who have successfully pursued I. C. S. Courses.

For instance, take the case of Joseph Williams. Mr. Williams was put to work in the mines when he was 10 years old and in all he had about 6 months' schooling, so you see he could not possibly have had much of an education to enable him to understand mathematical problems in mining engineering. At the time he enrolled he had a family to support on earnings of less than \$50 a month, so again we have not much trouble in realizing that he had no money to spare; and as for time, his hard labor in the mines often lasted long over the regular working hours. But all this did not phase Mr. Williams, he had the sincere ambition to better himself, so he became an I. C. S. student and faithfully pursued his studies until they brought him the reward of a position as Mine Inspector for the Tenth Bituminous District of Pennsylvania, at a salary of \$3,000 per year. Mr. Williams says: "It would have been impossible for me to secure my present success had I not enrolled in your Schools. I shall never grow tired of praising the I. C. S. for what they have done for me and mine." Mr. Williams' address is 2425 Beale Avenue, Altoona, Pa.

It brings us back to the childhood days of fairy tales when we say that a man gained success by picking up a pretty looking piece of paper, but such is an actual fact. Louis P. Tenca, 1348 Ellsworth St.,

Philadelphia, Pa., was a mechanic employed at the Baldwin Locomotive Works. He had but recently come to this country and could not read, write, or speak English. One night when going home from work he noticed a piece of paper lying on the street which attracted his attention. He picked it up and carried it to the pastor of his church and asked him to translate the reading matter to him. It happened to be an I. C. S. Circular, and as a result of his curiosity Mr. Tenca decided to enroll. In studying his Course he was obliged to read three books instead of one, a grammar, a dictionary in two languages, and an I. C. S. Textbook. He was obliged to translate his Instruction Papers into his own language before he could study them, and then translate his answers into English. But with perseverance and the never tiring assistance of I. C. S. instructors he gained the technical knowledge which enabled him to advance to a position as locomotive erector for the Baldwin Works and to secure a large increase in earnings.

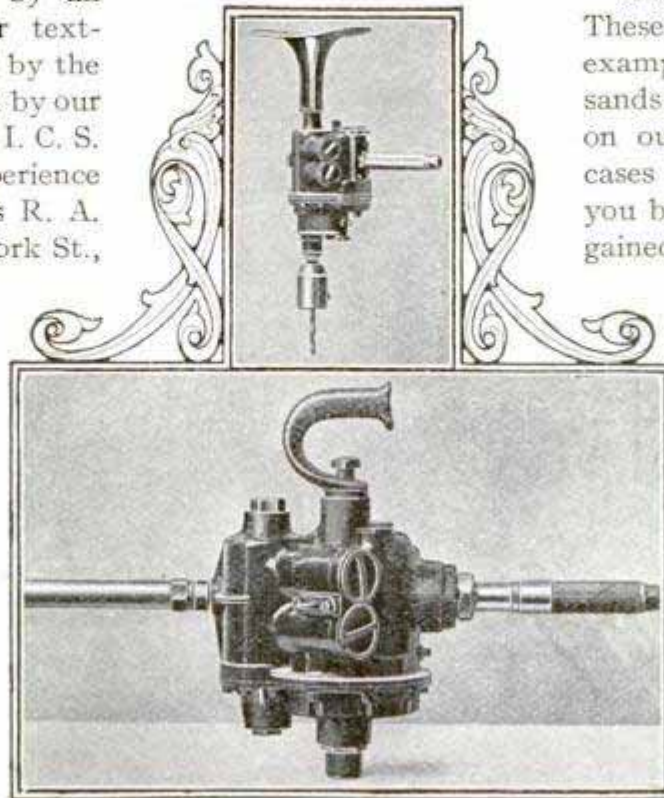
Practical Success

There are also some people who believe that the instruction afforded by the I. C. S., however excellent it may be as far as it goes, yet does not provide the student with



I. C. S. BUILDINGS OCCUPIED ENTIRELY BY THE SCHOOLS

a thorough, complete, and detailed knowledge of the profession he wishes to follow out. That this is a wrong idea may be readily ascertained by an examination of our textbooks and is proved by the results accomplished by our students. One I. C. S. student whose experience nullifies this idea is R. A. Norling, 489 New York St., Aurora, Ill. Mr. Norling enrolled in his I. C. S. Course when he was employed as an inspector at the Elgin Watch Factory. The excellence and thoroughness of the instruction contained in the Mechanical Course in which he enrolled provided a knowledge that has enabled him to



WOOD-BORING MACHINES
Invented by Student R. A. Norling

become an inventor of many intricate machine appliances and he is now mechanical engineer and tool designer for the Aurora Automatic Machine Company, of Aurora, Ill., and has full charge of the patternmaking, experimental room, and drafting room of this concern. His earnings have increased 250 per cent. and the royalties received from his twelve patents make this amount a good deal more. Mr. Norling says of the I. C. S.: "I feel that my own experience warrants me in recommending the I. C. S. to any ambitious man who wishes to advance in his trade."

Just to show that the I. C. S. is one of the most powerful influences toward advancement-gaining in the world, let us relate the experience of Eugene Popper, 544 Clark St., Chicago. Mr. Popper applied for a position to Ernest F. Smith, superintendent substations, Chicago Edison Company. In giving Mr. Popper the place, his employer said: "I had 200 applicants for this position, but I am going to give it to you because you have such a good reference." In commenting on this, Mr. Popper writes: "My reference was an I. C. S. letter of

recommendation, and that was all. Now you can see what the largest concerns in the United States think of the I. C. S."

And so the story runs. These few cases are merely examples taken from thousands of others that we have on our files—thousands of cases that would astound you because the men have gained advancement so quickly and so easily. Yet it is all plainly understood when you consider that a six-million dollar institution has spent 16 years in constantly perfecting a system of education that will qualify ambitious men and women of small means to gain promotion to the highest places in their trades and professions.

How you can gain advancement in this way; how you can qualify in your spare time, in your own home, and at an insignificant cost for a better position and a better salary will be explained, free of charge, if you are interested enough in your future welfare to clip, mark, and mail the coupon below. Will you let a postage stamp prevent your winning a better position?

INTERNATIONAL CORRESPONDENCE SCHOOLS

Box 872, Scranton, Pa.

Please explain, without further obligation on my part, how I can qualify for a larger salary and advancement to the position before which I have marked X

- | | |
|---|--|
| <ul style="list-style-type: none"> • Bookkeeper • Stenographer • Advertisement Writer • Show-Card Writer • Window Trimmer • Commercial Law • Plumb. & Heat. Con't. • Illustrator • Civil Service • Chemist • Textile Mill Supt. • Electrician • Elec. Engineer | <ul style="list-style-type: none"> • Mechanical Draftsman • Telephone Engineer • Elec.-Lighting Supt. • Mechanical Engineer • Surveyor • Stationary Engineer • Civil Engineer • Building Contractor • Architect'r'l Draftsman • Architect • Structural Engineer • Bridge Engineer • Mining Engineer |
|---|--|

Name _____

Street and No. _____

City _____ State _____

AN ELECTRIC HOME

In Which Motors, Wires and Lights Solve the Servant Problem and Do Other Marvelous Things

Various ingenious electrical appliances which almost completely eliminate the necessity of personal servants and make life a "dream" have been installed in a house in France, considered one of the most wonderful in the world from a mechanical standpoint. Not quite satisfied, however, the owner, who is also the inventor of many of the appliances, is drawing plans for a house which he believes will be the model home of the future.

In the house now occupied are not only devices invented and in use by other people, but new ones invented as the necessity presented itself. The gate of the villa is controlled by a motor from the house. By means of telephone, search-light, and a series of mirrors, anyone within the house can converse with, and examine persons seeking admission. An electric oven, equipped with an automatic indicator which gives warning when the dish is fully baked, insures a well served meal for the guest ushered in on the wings of Benjamin Franklin's discovery. A small dumb-waiter and table railway deposits the meal at its appointed place on the table; foot-warmers under the table, heaters around the room, and well arranged electric lights add to the excellence of the service. By an automatic ventilating system fresh, perfumed air is introduced when the temperature of the room rises to a certain point. Other rooms as well fitted eliminate servants as much as possible.

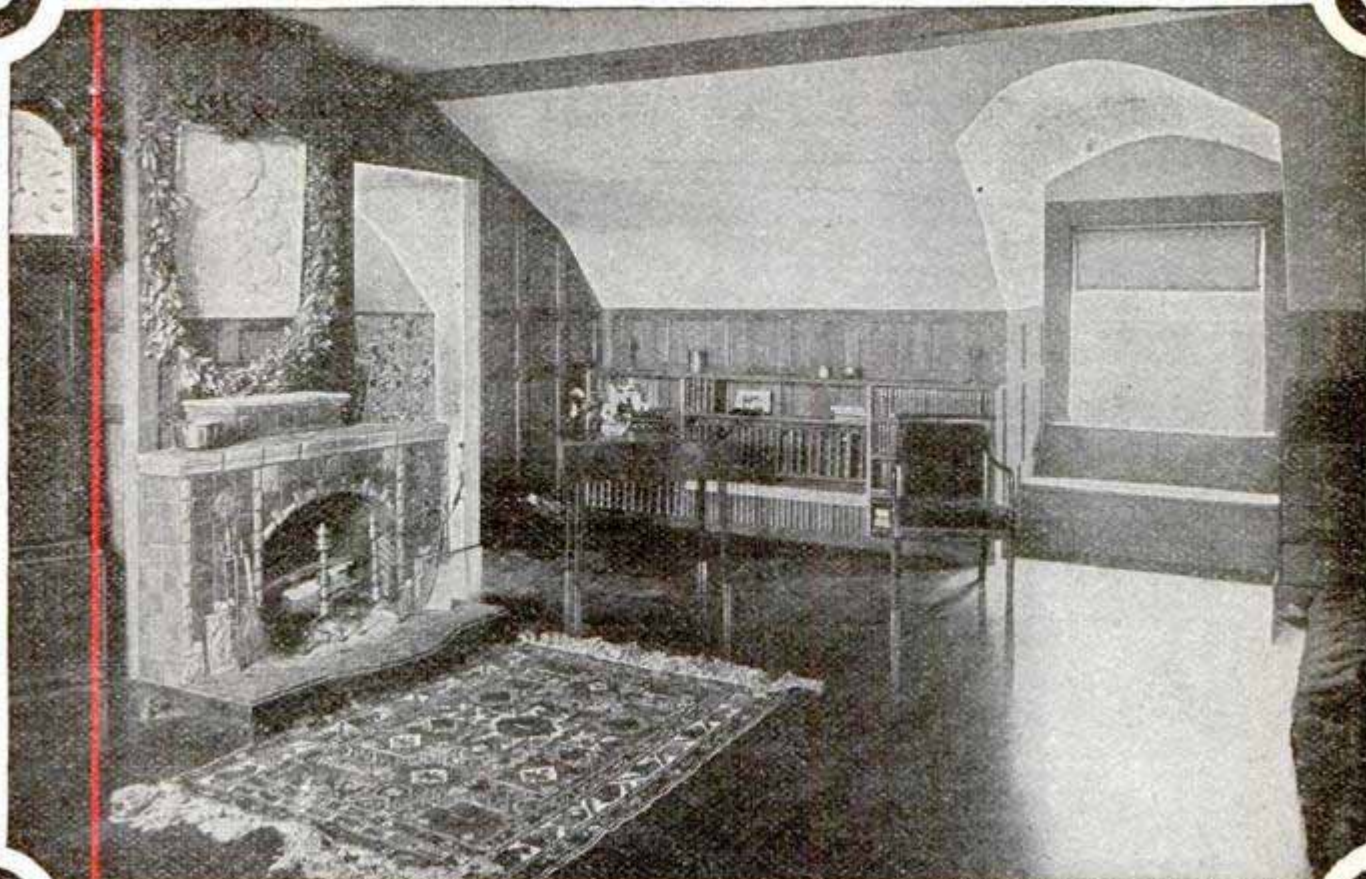
All this, however, is but little compared to the marvelous things electricity will be called upon to accomplish in the new house soon to be constructed, all of which can be carried out successfully. Not satisfied with controlling the temperature of the house only in winter time, the building will be constructed with double walls, separated by a space 2 ft. wide, through which cool air will be circulated during the summer. This space will also be utilized for pipes, wiring, and a dumb-waiter system which will serve persons in any room in the house. Each room will be fitted up so that a touch of a button will raise or lower shades, open or close shutters, control the temperature, bring refreshments from pantry and the mail and papers from the porch: Without, mind you, even a whispered order.



Armor Attached to Tire

ARMOR AS AUTO TIRE PRO- TECTOR

Automobilists are greatly interested in a new steel armor device for the protection of pneumatic tires. The armor is made in sections consisting of rings to which small links are attached, and top plates to which the two side plates are fastened. The tire is covered by hooking the three piece part to the small links. The top plate is a center hinge with corrugations on the face. The rings have loops, with a trifle over 2-in. draw, so that when the tires are inflated the ring spreads, spacing the plates and holding them firmly in position.



LOIS L. HOWE, Architect, Boston.

LIQUID GRANITE

and the Home Beautiful

Varnish occupies a conspicuous place in the making of modern homes, and **Liquid Granite** is the most desirable, durable and satisfactory varnish yet produced for **Floor Finishing** and all other domestic purposes. ❁ ❁ It is invaluable in restoring Oilcloth and Linoleum. ❁ ❁ It is easy to apply and difficult to deface. ❁ ❁ Put up in cans of convenient size from $\frac{1}{2}$ pint to 5 gallons.



Send for samples of Finished Woods and information on Wood Finishing and Home Varnishing, — *Free on request.*

DEALERS EVERYWHERE

New York
Boston
Philadelphia
Baltimore

BERRY BROTHERS, Limited

Varnish Manufacturers

Department A, DETROIT

Canadian Office and Factory: Walkerville, Ont.

Chicago
Cincinnati
St. Louis
San Francisco



B. A. Alderson G. M. Dodge, Pres. P. H. Swain



E. F. Rainier



F. R. Luabeck

LEARN PRACTICAL TELEGRAPHY AS TAUGHT BY THESE Practical Expert Operators

Practical telegraphy is the only kind to learn. It's the only kind my school teaches. I guarantee good paying positions to all my graduates because, unlike all other schools, they are taught by practical expert operators. Railroads prefer "Dodge School Graduates" because they are proficient. Living expenses in Valparaiso are very low and can be earned while learning. **Easy Payments.** Correspondence instruction if desired. Write me today for catalog.

GEO. M. DODGE, Pres.

DODGE'S INSTITUTE of TELEGRAPHY
Eighth Street, Valparaiso, Ind.

"The Only School Owning and Occupying a Building Devoted Exclusively to Teaching Telegraphy."

HOT WATER IN 2 MINUTES Cost—Two Cents

The **Peerless Kitchen Boiler** has solved the hot water problem, in city and country homes, hotels, restaurants, clubs, bath-houses and gymnasiums. Burns either gas or gasoline; heats water to 185° and keeps it hot at **one-half cent per hour.** A hot bath in **two minutes** for **two cents.** Simple in construction—only **three parts**—disk, burner, drum. Absolutely noiseless and odorless. Occupies but a very small space; easy to install and connect. **PRICE, surprisingly moderate.** Ask your plumber about the **PEERLESS**, or **write for catalog, prices and discounts.**



JAMES McCARTNEY
39 State Street, - CHICAGO



OVER
15,000
IN USE
There is a reason for it

GEM ADDING MACHINE
Carries automatically. Automatic resetting device. Visible total. Collapsible holder.
Sent on Ten Days' Trial at our Expense

E. GANCHER
Automatic Adding Machine Co.
332 Broadway
New York

\$ 15 **\$ 15**

SHIPLOADS OF FROZEN RABBITS.—The people of Australia have found a way to turn their plague of rabbits into a blessing—they are freezing and exporting them by shiploads. At Sidney, N. S. W., a mechanical freezer has been set up recently having a capacity of 14,400 rabbit stiffs daily. In 1906 the value of the bunnies thus exported for their country's good was \$2,387,000, and their skins were worth \$1,437,000 more. This year those values are likely to be doubled, with a corresponding increase of deviled chicken, tinned veal and boneless turkey to be consumed in merry England.

Corks steeped in petroleum are not affected by acids or chemical fumes, and do not stick after long disuse.

A SUBSTITUTE FOR THE PRONY BRAKE.—An electric dynamometer is manufactured by an English firm which is said to be a decided improvement on the brake in determining the horsepower of engines and motors of all kinds. This device utilizes the pull between the armature and the field magnets—which is very strong and is proportioned to the rapidity of the armature's revolution—as a substitute for the friction of the brake. In order to do this the field is so mounted that it can oscillate in response to the pull, and to it is attached a horizontal scale arm with a sliding weight. Now connect the engine to the armature by means of a belt, and start it. The horsepower of the engine can be measured exactly by the weight required to keep the field from oscillating.

The Far Eastern Review is a large 80-page monthly magazine published by George Bronson Rea, at Manila, Philippine Islands; it is devoted to engineering and commerce of the Far East. The magazine is handsomely and profusely illustrated, printed on fine book paper, and editorially and typographically ranks high with our best trade journals published here at home. The amount and character of its advertising is a revelation to those not familiar with the mechanical progress of that part of the world. Subscription to the United States is \$3 per year, postage prepaid, and anyone thinking of extending business lines into eastern Asia or our island possessions will find much to interest and inform in this journal. It is printed entirely in English.

Manufacturers of Various Styles and Sizes of Draughting Tables, Drawing Boards, Blue Print Filing Cabinets, Blue Print Frames, Etc.
Send for Illustrated Catalogue or ask your jobber.



FRITZ & GOELDEL MFG. CO.,
99 Alabama Street, Grand Rapids, Mich.

MECHANICS

WE SELL EVERYTHING

Mechanical Tools, Devices, Appliances and every home need and necessity direct to you at wholesale prices. Are you a builder? Are you a laborer? Are you a contractor? Are you a plumber? Are you a carpenter? Are you a telephone or telegraph operator? Are you a blacksmith? Are you an engineer? Are you a draftsman? Are you an inventor? Are you an engraver? Are you a bricklayer? Are you a manufacturer? Are you a painter? In a word, do you have home needs or business needs of any kind? If so, you are losing money if you do not order from our **Catalog No. 68 The Economy Guide Book** We sell everything direct to the user. Do you want to

A POSTAL WILL BRING IT. WRITE TODAY.
SAVE \$50.00 OR MORE EACH YEAR?

Brass Trimmed Bed \$3.95



This extra high grade iron bed is made of the best material, trimmed and ornamented with brass. It is as rich a design as was ever produced for double furnished in white, green, blue and black. Three sizes, 3-6, 4-0 and 4-6.

ever produced for double furnished in white, green, blue and black. Three sizes, 3-6, 4-0 and 4-6.

Davenport Couch \$5.10

This fine Davenport bed couch has a fine drop front with patented lazy tong. Workmanship and material is the best; very easy to sit or sleep on; 6 ft. 2 in. long, 4 ft. 2 in. wide. Seat is 18 ins.



Dining Chair 85c Each



A beautiful saddle seat diner, with a 10 in. top slat, handsomely carved, and seven fancy turned back spindles. The chair is made of hardwood, gloss finished, and has short brace arms and strong, well braced legs.

Easy Rocker \$2.95

Here is one of the handsomest chairs that can be found for the price, material and workmanship considered. It is strongly made, finished in golden oak and birch mahogany. The panels are deeply carved and connected by a highly polished banister. It has a cobbler seat of ample proportions.



Our latest Economy Guide Book explains how. It is a necessity for the mechanic, farmer, laborer, painter; in fact, everybody who desires to make every dollar go as far as possible. We pay the postage on this book; we will give one copy FREE to every grown person who asks for it. We invite you to be one of them.

This catalog contains nearly one thousand pages, full of pictures, photographed from the original articles, which are fully and accurately described and shows everything quoted at wholesale prices. Our catalog has become a reference book in every home and our name a household word throughout the country. The articles shown here are good values for the money. Send a trial order today. Order one or more articles from this page and send the money with the order. We guarantee safe delivery.

Order One or More Articles from this ad.

Our Guarantee We positively guarantee that all purchases of every kind from us will be absolutely satisfactory and that the goods ordered will be exactly as represented. We protect you by refunding your money if you are not satisfied. Send us an order today.

Our References We are incorporated for One Million Dollars and refer you to Dun's or Bradstreet's Commercial Agency, or any railroad or express company. Write to the editor of this paper.

Advertising Coupons In our New Economy Guide Book No. 68 we explain all about the large list of valuable articles given absolutely free to our customers for helping us advertise. In this list are found Gasoline Engines, Paint and Roofing, Planos, Buggies, Sewing Machines, Watches, Clocks, Jewelry, Harness, Shoes, Carpets, Rugs, Curtains, Clothing, Tools, Stoves, etc., etc., all Free.

Freight Allowance In the Index Section of this Mammoth Catalog we show hundreds of articles which we put in each shipment extra to help pay the freight and express. Our Advertising Coupons and Freight Allowance Articles are offers that no other Mail Order House has ever been able to make. Send for our catalog today. By using it, others have saved \$50.00 annually. **IT WILL PAY YOU.**

Albaugh-Dover Co.
 900-965 Marshall Blvd., CHICAGO, ILL

Single Harness \$8.75



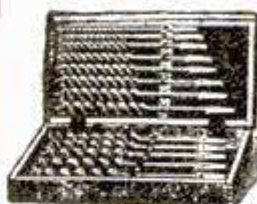
Our Special Choice Harness with double and stitched traces; is sold everywhere at from \$10.00 to \$15.00 per set. You should order one of these special sets today.

26-Inch Hand Saw \$1.00

Our special high grade New York Saw is made of London spring steel of the highest grade; guaranteed perfect, patent ground and tempered. Every saw is hand filed and ready for use.



Bit Set \$1.75



This set of 13 special selected Auger Bits with double spur, sizes 1/4 inch to 1 inch inclusive. These bits are made of the very best material and put up in nice wood box.

Asphalt Roofing \$1.40 Per Square (10 x 10 ft.)

This roofing is made from the finest grade wool felt, guaranteed to contain no coal tar; will not dry out, is coated with superior damp-proof material and cannot evaporate. A special grade at a special price.



INCREASE YOUR HEIGHT BROADEN YOUR SHOULDERS

Anyone Can Now Secure a Perfect Figure



You can add from 2 to 5 inches to your height, broaden your shoulders, and increase your chest measurement by the simple, harmless and practical invention of a business man.

Neither operation, electricity nor drugs are needed to secure these happy results. It causes **no pain, no trouble** and necessitates **no loss of time or detention** from business. Anyone, young or old of either sex, can successfully use this treatment in the privacy of their own home. Eminent doctors, scientists and gymnasium directors have endorsed it. Leading colleges and universities have adopted it. It is impossible for anyone to use this method without obtaining marvelous results.

FREE TO ANYONE

Exactly how it is done is explained in an intensely interesting book, beautifully illustrated from life, which the inventor will send absolutely free of charge to all who ask for it. If you would like to increase your height and secure a perfect figure, if you want to overcome the embarrassment of being short and stunted; if you desire to secure all the advantages of being tall, write today for this free book, which will be sent you by return mail, free of all charge, in a plain package. Do not delay, but learn the secret at once. Simply address

CARTILAGE COMPANY :: 19 B Unity Bldg. :: Rochester, New York

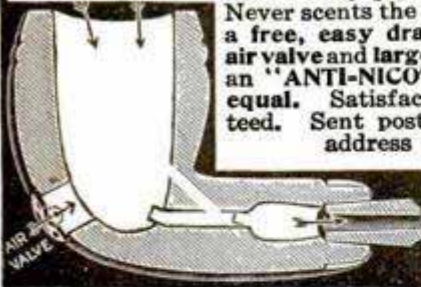
FRYER.

Smoke an Anti-Nicotine Pipe

and experience for once a cool, delightful smoke, free from every trace of nicotine. Not a particle of anything enters the mouth but smoke. Smokes absolute dry—no sizzling. Every grain of tobacco is burned—a saving of 25%. Never bites the tongue or mouth. Only pipe that can be smoked in comfort, while lying down. Lasts longer than an ordinary pipe. No offensive odors. Never scents the house or clothes. Has a free, easy draught. Note the cold air valve and large stem—that's why an "ANTI-NICOTINE" PIPE has no equal. Satisfaction guaranteed. Sent postpaid to any address on receipt of

50c

The Anti-Nicotine Pipe Co., Dept. A, Ottawa, Illinois



UNITED STATES SUPPLIES PINS.—The mills of the United States practically supply the entire demand for pins. In 1900, the census year, 68,889,260 gross of common pins were manufactured in this country, and in 1905 over 75,000,000 inhabitants used 60,000,000 gross, or an average of 115 pins for every man, woman and child.

WORKING HOURS IN JAPAN.—Although the Japanese know little and care less about the Sabbath, they are finding out, as others have, that it is the wisest possible institution even from a merely industrial standpoint. It has been customary to run their mills as near perpetual motion as machinery and muscles could be forced to go, the operatives having but two rest days a month besides the ten national holidays in a year. At noon they take turns in getting a half-hour lunch, so that the work may go on continuously. But the strain is too great for even Japanese nerves, impairing both speed and efficiency, so that some of the largest mills have come to see the wisdom of adopting a seventh day of rest.

Each mill has its own methods, which it guards with jealous secrecy. Consequently there is a great field for consulting engineers in Japan, since a new mill can get no help from those already established through either advice or observation, and must depend upon hired expert advice in selecting machinery, materials and processes.

PEERLESS BOOK FORM CARDS

NOTICE SMOOTH EDGES OF CARD WHEN DETACHED



Write us for Samples and Prices.

ARE BOUND TO ATTRACT ATTENTION

They are bound together in tabs of 25 and when detached from book, all edges remain perfectly smooth—no perforation whatever. When your cards are carried loosely in case they seldom have a fresh clean appearance. In **BOOK FORM** every card is always perfect, no matter how long carried. It is a **DRAWING CARD**, because every man who sees it detached from book, wants to look closer and examine it. Your card is then laid aside for future reference, and your interview is gained. Let us send you a sample tab of these **ENGRAVED BOOK FORM CARDS**. The result will surprise you.

THE JOHN B. WIGGINS COMPANY
SOLE MANUFACTURERS

ENGRAVERS - PRINTERS - DIE EMBOSERS
17-19 EAST ADAMS STREET, CHICAGO

J. R. ANGELL, Ph.D. - A. S. ISAACS, Ph.D. - E. MURRAY-AARON, F.R.G.S. - J. C. HOPKINS, F.S.S. - L. LYNDON - Electricity
 Cartography
 Semitic Subjects
 Philosophy
 Medicine
 Mechanics
 F. L. STEDMAN, M.D. - C. H. COCHRANE

R. JOHNSON, Ph.D. - R. G. GREENE, A.M. - C. J. CHAMBERLAIN, Ph.D. - F. N. COLE, Ph.D. - A. S. DRAPER, L.L.D.
 Dictionary
 Biography
 Botany
 Mathematics
 Education

THE Editors Encyclopedia

and Dictionary contains 40 volumes, 100 maps, 7,000 illustrations, 30,000 pages and the world's knowledge all written and arranged by nearly 1,000 of America's greatest editors. A product of American brains, American energy and American co-operation. Defines and pronounces every legitimate English word. Contains the biography of every important person, living or dead. Made by the men whose practical experience has taught them what to include and what to omit.

AN Up-To-Date Library.

A practical work written by practical men for practical people; embracing all that is known of history, literature, education, philosophy, psychology, mathematics, religion, art, biography, science, medicine, civics, sociology, commerce, geography, mechanics, electricity, botany, zoology, etc. The whole accumulated learning and wisdom of the world from the dawn of recorded thought to the present year, with each subject presented in plain, clear and simple language.



A Few Sets Only, Now Offered

The editors have arranged to distribute a few sets of this new work in each vicinity at a very small price and on easy terms. Cut out and mail the coupon today and receive free a handsome book containing illustrations, portraits, maps, beautiful colored plates, sample articles, etc. With this book we will send you full particulars telling how easily you can own this great reference Library.

Mail Coupon Today

Cut This Out and Mail Now

It implies no financial obligation whatever. We want you to know why this new work is better than any other and cheap only in price.

UNITED EDITORS ASSOCIATION, Dept. D
 Cable Building, 28 Jackson Blvd., Chicago, Ill.

GENTLEMEN:— Please send without cost to me sample pages and full particulars regarding your new Encyclopedia and Dictionary.

Name _____

Address _____

Last month we proved to many people that they could make \$3,000 clear profits each year.

We are ready to prove that **\$3,000.00 Can be Made**

This year, next year, and the years after Cleaning houses by our patented machinery, by energetic, competent men. Over 300 operators in as many towns in the United States.

We make the most efficient stationary systems for Residences, Hotels, Office Buildings, Etc.

Central Booth Machinery Bldg., Jamestown Exposition

Genl. Compressed Air and Vacuum Machinery Co.

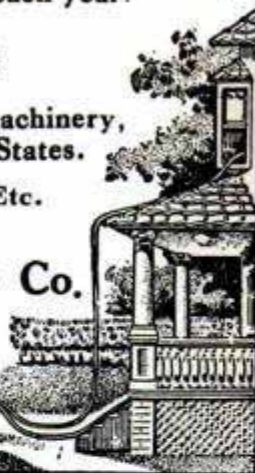
4452-B Olive Street, ST. LOUIS, MO.



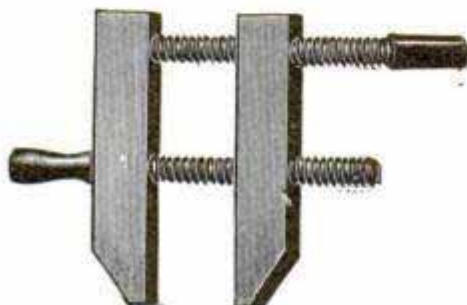
THE MACHINE THAT MAKES THE MONEY

WRITE FOR CATALOG

WE OWN THE PATENTS AND ARE PROSECUTING ALL INFRINGERS



FOR HOME SHOPS



SEVENTEEN SIZES

The only Hand Screw with the Saw-Cut Threaded Spindle and Michigan Hard Maple Jaws.

That is why they last longer and still cost no more than the "just as good" kind.

Be sure and ask, when buying, for the Grand Rapids make.

GRAND RAPIDS HAND SCREW CO.

920 Jefferson Ave.

GRAND RAPIDS

MICHIGAN

TALKING WITH MARS.—Will we ever speak to the people of Mars? Professor Charles S. Howe, of Case School of Applied Science, Cleveland, and a common sense scientist, says emphatically, "never."

He drew two ellipses on paper, one to show the path of the earth and the other that of Mars.

"Now this year we are as near to Mars as we ever get, 38,000,000 miles, and we must wait fifteen years before we get this close again," he said.

"The most powerful telescopes we have magnify 2,500 times. That is equivalent to seeing over 15,000 miles with the naked eye, or, in a practical illustration, a city the size of London on Mars would look as big as a pin point at arm's length.

"Is Mars inhabited? So far as climatic conditions are concerned, it might be, but astronomers have not yet proved that it is.

"We know for a certainty that Mars has the same seasons we have, but her year is almost twice as long, consisting of 687 days that are practically the same length as our day.

"Astronomer Percival Lowell, at his observatory in Flagstaff, Arizona, has shown by his maps that the mountain peaks are snow-capped in the winter, and in the spring the water flows down the valleys into canals that are 50 miles wide and then vegetation springs up. He calls these streams canals, not because they are artificial, but because the Martian waterways run in a straight line to the oceans instead of meandering as ours do.

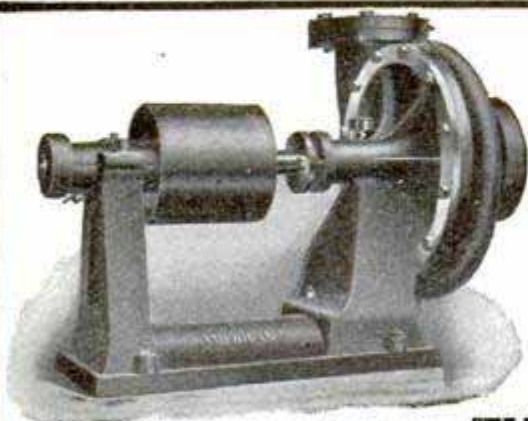
"Until our telescopes are increased in power many fold, our determinations of the physical geography of Mars are at a standstill, but with the spectroscope much valuable information is being gathered concerning her composition.

"If Mars is inhabited, and we of the earth should want to communicate with her, it would be done with flashes of light, but this would be unintelligent because of want of a code, and the impossibility of arranging one.

"No, we will never talk with Mars, even though we find she is inhabited. Remember, 38,000,000 miles is a long way off."

However, equally learned men, for their own day, pronounced as impossible such things as the rotundity of the earth, the law of gravitation, the steam locomotive, and telephones. Great and unexpected things will happen during another hundred years. Wireless seemed as impossible less than 25 years ago.

A SUBMARINE OIL SPRING off Cape Hatteras turned out to come from an oil barge wrecked there last year and supposed now to be breaking to pieces.



(CENTRIFUGAL PUMP)

OFFICES:—
JOPLIN, MO.
DALLAS, TEXAS

WE MANUFACTURE THE "AMERICAN" MACHINERY

for the following described work:—

Well drilling and prospecting, rotary and coring work.

Deep well pumping machinery.

Air compressors for all duties.

Centrifugal pumps for irrigation and reclamation work.

We should be glad to mail printed matter to interested applicants.

THE AMERICAN WELL WORKS

AURORA, ILL.

First National Bank Bldg.,
CHICAGO

Please Mention Popular Mechanics

POPULAR MECHANICS ADVERTISING DEPARTMENT

WONDERFUL

Edison Phonograph Offer

At any time you wish you can have a free concert in your own home—not a concert of one instrument or voice alone, but a concert of band and orchestra music, vocal solos, grand opera as well as comic opera—*anything you like.*

**NEW STYLE 1908 Model
EDISON Parlor Grand Outfit
(New Outfit No. 5)**



TRADE MARK
Thomas A. Edison

Mr. Edison says:

"I want to see a Phonograph in every American home."

FREE TRIAL!

WHILE this offer lasts we will send to any reader of this paper a Genuine Edison New Style Parlor Grand Phonograph for free trial in your own home—a trial lasting two days to a week. Try the new Parlor Grand Edison in your own home. Then if you do not want to keep this wonderful instrument, you may send it back to us at our expense and we charge you absolutely nothing for the free trial. If you like the instrument with its marvelous variations of entertainment, including the latest popular songs, side-splitting minstrel dialogs, beautiful operatic airs sung by the greatest artists, its dreamy waltzes and stirring two-steps, its orations and elocutionary recitals, you may keep the instrument and send either cash in full or the smallest monthly payments at the **SURPRISING ROCK-BOTTOM PRICES** on the finest Edison outfits.

\$2 a Month now buys a genuine 1908 model Edison outfit including one dozen genuine Edison gold moulded records. The finest improved 1908 model Edison outfit only \$3.50 a month. And at rock-bottom price no matter whether you send cash in full or pay on our easiest terms.

For Cash in full: So many cash purchasers are getting the finest Edison outfits on free trial that we are obliged to announce again that Mr. Edison allows no discount for cash. We have already given those who buy on easy payments the lowest possible price and we must treat all Edison customers alike.

Edison Catalogs FREE

SIGN the Coupon

and get the great Edison catalog, quoting the rock-bottom prices—surprising prices—on the finest Edison outfits. Remember you get an absolutely free trial and can send either cash in full or easy monthly payments



FREE COUPON

Edison Phonograph Distribtrs.
F. K. BABSON, Mgr.
EDISON BUILDING,
Suite 1198, CHICAGO, ILL.

Without any obligations on me please send me your Edison catalog free, prepaid.

Name.....

Address.....

Don't bother with a letter; the coupon will do.

TRADE MARK
Thomas A. Edison

**SIGN the
Coupon
Now!**

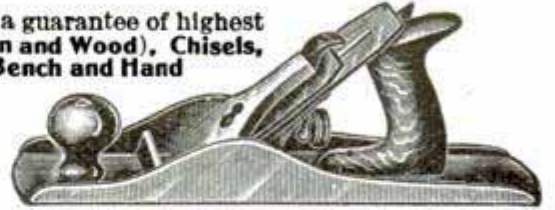
SEE THAT IRON?

It is used in "Ohio" Adjustable Planes exclusively. Being extra heavy at the cutting end where weight is needed, it absolutely prevents chattering and trembling when the plane is used on hard or knotty timber. Works equally well in soft wood. This is a point that is appreciated by the mechanic.

Under the Trade Mark shown above, which is a guarantee of highest quality, we manufacture a full line of Planes (both Iron and Wood), Chisels, Gouges, Drawing Knives, Auger Bits, Spoke Shaves, Bench and Hand Screws, Etc.

Every tool covered by a broad guarantee. It will pay you to insist on having "Ohio" Tools from your dealer.

Catalog No. P. sent on request.



OHIO TOOL COMPANY

COLUMBUS, OHIO

"YANKEE" TOOLS

ARE
WITHOUT EQUAL
IN QUALITY
OR EFFICIENCY
IN PRACTICAL USE

RATCHET AND
SPIRAL-RATCHET
SCREW DRIVERS
also DRILLS

ASK YOUR DEALER
TO SHOW THEM

SEND FOR OUR
"YANKEE" TOOL BOOK
SENT FREE

NORTH BROS.
MFG. CO.

PHILADELPHIA, PA.



ENGLISH COMMENT ON PACIFIC FLEET.—The following on the movement of our Pacific squadron from the London Sphere is interesting as showing how the event looks at a distance:

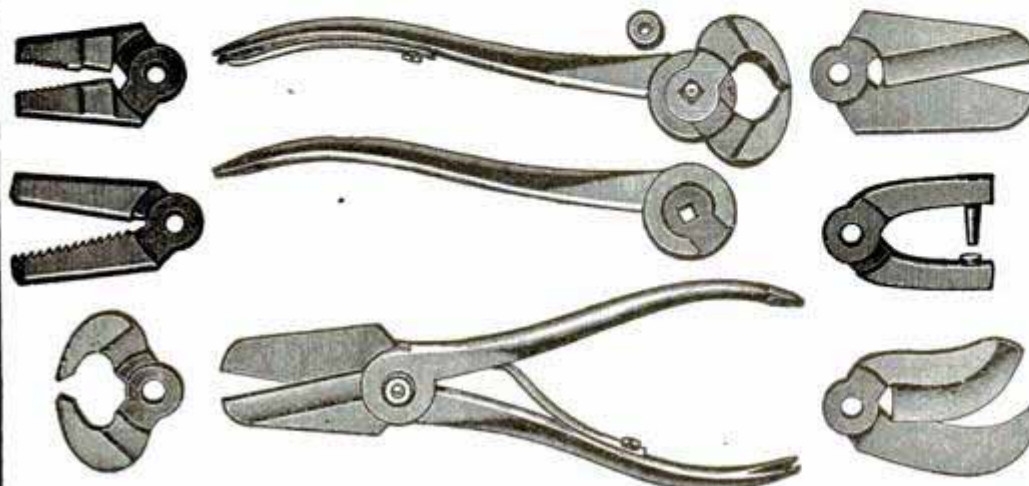
Although, however, there is no likelihood of a conflict, or even of increased tension in the near future, the move of the fleet to the Pacific coast is a natural and necessary step in a rivalry for the mastery of the ocean. Orders for steam coal to be sent to the western coast of South America show that the arrival of the fleet in Pacific waters is contemplated. At the same time measures are being taken to strengthen the defences of the Philippines. These precautions no more mean war with Japan than the concentration of British warships in the Channel and North Sea means war with Germany, but they are the natural measures of a state in view of a possible struggle. The friendly relations of the United States with European nations, and especially with Great Britain, render any need for a strong navy on the Atlantic coast very unlikely. If the United States have to fight for anything in the next few years it will be for the colonies and control acquired in the Pacific; and Japan is the only possible enemy in the existing state of affairs.

Were the American fleet going at once to the Californian coast, with the evident object of protecting the state against any Japanese hostility, it would be possible that the statesmen of Japan might venture to anticipate attack by themselves taking advantage of being ready first, as in the war with Russia; but this is not the case. While the military power of the United States is as yet unorganized, their naval force is, if anything, superior to that of Japan, and its efficiency would be very different from that of the Russians. The economic strength of America is so enormous that Japan would be foolhardy to provoke a conflict.

The struggle for the supremacy of the Pacific will come later, if it takes a warlike form at all. The distances between the possible belligerents are too great for successful invasion, unless one side meets with a crushing naval defeat, and though the American hold on the Philippines might not be hard to shake, the Japanese, were they to conquer the islands, would soon be as unpopular there as the Spaniards were and the Americans are. Hence a war between the United States and Japan, if it ever occurred, would be tedious and indecisive, and would end, if at all, by the economic exhaustion of the smaller state.

Weed destruction by the use of salt water from Great Salt Lake is being tried by the Oregon Short Line.

The Pennsylvania railroad has 223,743 cars.

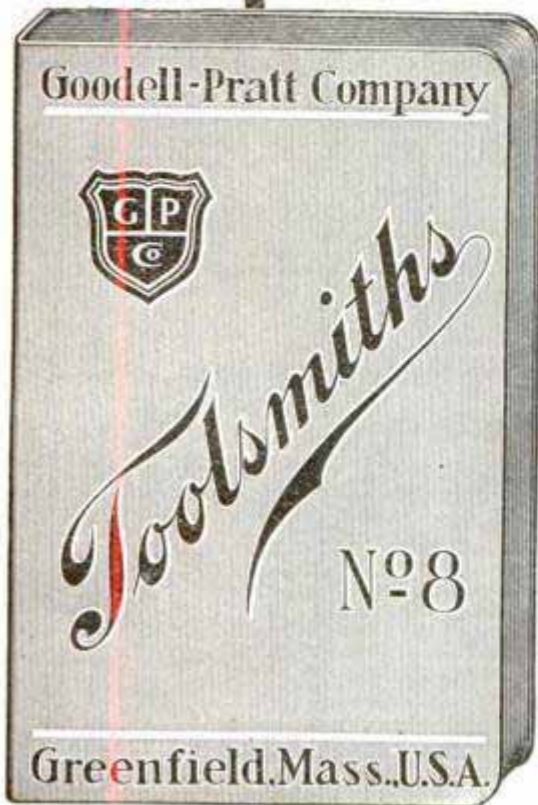


King of Its Kind

Koeth's Kombination Kit

Fifteen Tools and one pair handles for all. A complete and distinct tool every time you change it. Made of tool steel, drop forged, ground, tempered, polished and warranted. Simple, convenient, compact, low priced. You may have a whole chest of tools, but you will want this one when you see it, and once you have used it, you would not be without it for twice its cost. Sample set to you, prepaid for \$3.50. Salesmen wanted. Write for booklet. Do it today.

CURRIER, KOETH MFG. CO.
COUDERSPORT : PENNA.



FREE

OUR TOOL CATALOG

This is a book which no man who uses tools can afford to be without. It contains

208 PAGES

profusely illustrated and entirely devoted to labor-saving tools and devices.

This catalog we will send to you absolutely without charge if you will say so on a postal card and mention this magazine.

GOODELL-PRATT COMPANY
GREENFIELD, MASS., U. S. A.

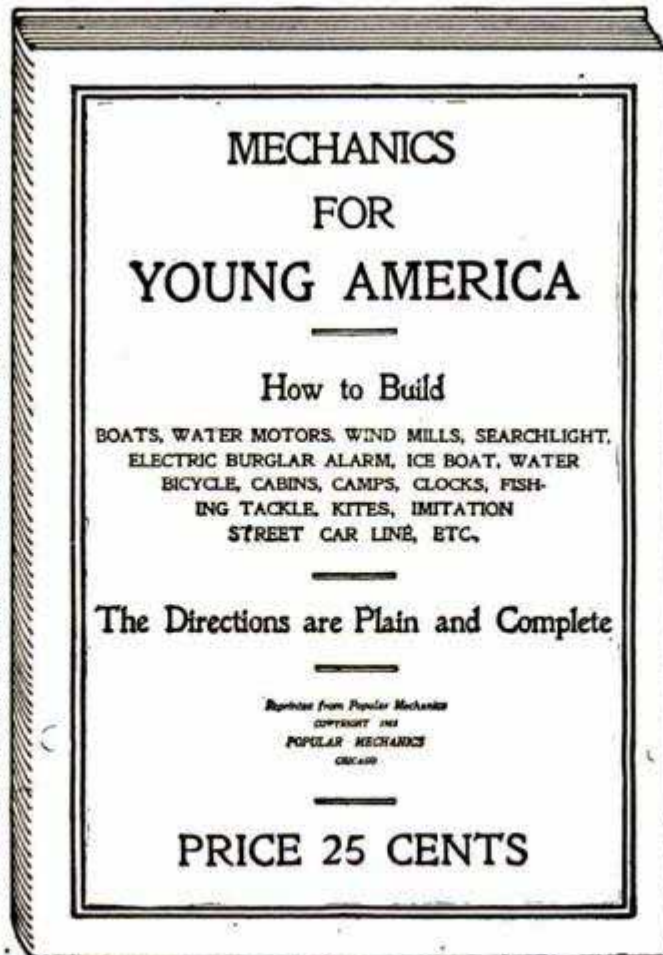
25c.

A BOOK FOR BOYS

25c.

How to Make a Paper Boat—How to Make a Barrel Boat—How to Make a Water Wheel—How to Make Your Own Fishing Tackle—Temporary Camps and How to Build Them—Permanent Camps and How to Build Them—How to Build an Imitation Street Car Line—How to Make a Water Bicycle—How to Make a Miniature Windmill—How to Build an Ice Boat—A Novel Burglar Alarm—A Mechanical Ventriloquist and How to Make It—How to Make a Boot-Blackening Cabinet—Renewing Dry Batteries—How to Make Water Motors—How to Make "Antique" Clocks from Up-to-date Materials—Lettering a Clock Dial—How to Make a Windmill of One or Two Horsepower—How to Make a Trap for Rabbits, Rats and Mice—How to Make a Small Searchlight—Kites of Many Kinds and How to Make Them—Jug Fishing—How to Do Ornamental Iron Work—Ornamental Metal Guards for Open Fireplaces—How to Make a Propelling Vehicle—How to Make a Water Telescope—How to Make Paper Balloons—How to Make a Hectograph—Useful Articles and Ornaments Made of Old Bicycle Parts—Devices for Winter Sports,

Your Newsdealer will order it for you, or sent postpaid for 25cents by
THE PUBLISHERS



How to Make and Use Them—Coasting Sleds, Chair Sleighs, Toboggan Slides and Skis—How to Make Rubber Stamps—How to Make a Baggage Carrier for Bicycles—A Water Candlestick—Boy's Hand-Power Auto, How Made—How to Make a Pair of Dumb-Bells—How to Rid Your Yard of Cats—How to Make an Easel—To Light a Gaslight Without Matches—Things a Boy Can Make Out of Old Bicycle Parts—How to Make a Wind Propeller—Photographing from a Captive Balloon—How to Make a Simple Burglar Alarm—To Make a Binder for Popular Mechanics—How to Make a Hammock—Electric Rat Exterminator—How to Make a Miniature Steam Turbine—How to See Through Your Hand—How to Make a Wood-Turning Lathe Out of an Old Sewing Machine—How to Remove Stains from Marble—How to Make a Turbine Engine—How to Make a Lead Cannon—How to Make a Wireless Telegraph System—How to Make a Toy Battery Motor Lift a 10-lb. Weight—To Renew Old Dry Batteries—Weatherproofing for Tents—How to Make an Electric Furnace Regulator—How to Make a Simple Fire Alarm—How to Make a Bell Tent.

Published by
POPULAR MECHANICS
160 Washington St.
CHICAGO

A GOLD MINE FOR MECHANICS



Whether mechanics is your business or your diversion, you ought to have a copy of this GREAT CATALOG—No. 93, 700 pages, full of everything you can imagine for the shop, home and farm. Tools and Tool CABINETS of all kinds; supplies for machine or electrical work; general and special hardware; over 75,000 labor-saving, money-making articles, all at the very Lowest Prices that these goods can be bought for in any store in any city anywhere.

That's pretty strong, but you can prove it.

WHY DON'T YOU BUY IN NEW YORK?

This catalog shows you how to do this and save money. We sell to you in small or large lots at wholesale prices. This catalog costs us \$1.00 to print, but is sent postpaid FREE of charge to all who ask for it in good faith. WRITE FOR IT TODAY. We will send you our premium list, containing 100 valuable and useful articles given away FREE. Also our Grocery List, showing how

you can save one-third on your living expenses. WE SELL RELIABLE GOODS ONLY. We guarantee satisfaction or refund your money. We also guarantee safe delivery of all goods ordered of us, and refer to the publisher of this paper as to our responsibility.

WHITE, VAN GLAHN & CO., 30 Barclay Street, NEW YORK CITY
Oldest Mail-Order House in America. Estab. 1816.



Prices from \$10 up

BEWARE OF IMITATIONS

For the protection of our customers we advise that Klein's Pliers are being imitated, to look like Klein's. This, however, does not make them Klein's.

CAUTION Look for this stamp, M KLEIN & SONS, on the inside of handles—none are genuine without this stamp. Use only genuine Klein's. They are the product of years of experience and have stood the test of time.



Send 3c stamp for 60-page catalogue

MATHIAS KLEIN & SONS 36 W. VAN BUREN ST. CHICAGO, ILL.

CUTS BAR IRON, SOFT STEEL QUICK

For Repairmen, Blacksmiths, Tanners, Machinists, and all Metal Workers who cut rods of soft steel or iron. A little wonder for strength, capacity, speed and durability.

"THE KID CUTTER"

is only 17 inches long and weighs only 75 pounds. Cuts bar-iron or soft steel 1½ in. x ¾ in. round and under. For descriptive circular and price, address

G. N. & H. S. KINGSLAND
 Box 15, Keesville, N. Y.



WRITE FOR Part Pay Terms

Ideal Machine Works
 Brooklyn, N. Y.



A—Iron Feed Screw
 B—Automatic Feed
 C—Tread
 D—Vise or clamp
 E—Broad Sliding Bar
 F—Vise, Separate

GEARS

INTERNAL and EXTERNAL of all kinds

Ask for Catalog
 Grant's "Treatise on GEARS" a dollar

Philadelphia GEAR Works, Inc.
 7th and Cherry Sts. Philadelphia



IN MOSCOW.

Bang!

Pale and trembling an aid rushed through the gilded corridor to the private office of the governor-general.

That eminent official looked up.

"What caused that explosion, Petkoff?"

"A-a bomb, your excellency."

"A bomb, eh? I'm glad of that. I was afraid it might be one of my automobile tires."

And he resumed his writing.

OFFICIAL REPORT ON FRISCO FIRE.—One feature that the governmental investigation of the San Francisco disaster has brought to light is the greater need of protection for buildings from exterior fires. The interiors are, as a rule, fairly well guarded, but the risks of a building catching fire from outside sources are very great. Fire shutters on all sides and cornice sprinklers should be provided. All exposed woodwork should be treated with a fireproofing substance. In short, the exterior of a building should be able to withstand heat as readily as the interior.

Another point which developed was, that while hollow tile formed an excellent protection for steel, its good effects were mitigated by the use of poor mortar. In almost every case the latter disintegrated under the intense heat and allowed the tiles to drop away, thereby exposing the steel work to the flames. Only the best of Portland cement mortar should be used to bond the fireproofing together.

SOUTHERN PACIFIC DECLARES COLORADO RIVER IS CONTROLLED.—The break in the Colorado river—a gap one-fifth of a mile long through which the waters at a depth of 30 ft. were rushing into Salton Sink, imperiling the homes of 10,000 people and involving five millions of dollars—is at last declared effectually closed. The river had been tapped to irrigate the rich loam of the vicinity and the result was as stated. The Southern Pacific railroad advanced \$1,500,000 to repair the break and the work was accomplished in just two weeks of ceaseless toil. The waters are held in check by a 60-ft. dam, 4 ft. above the highest known level. The building of this dam was described in our March, 1907, number.

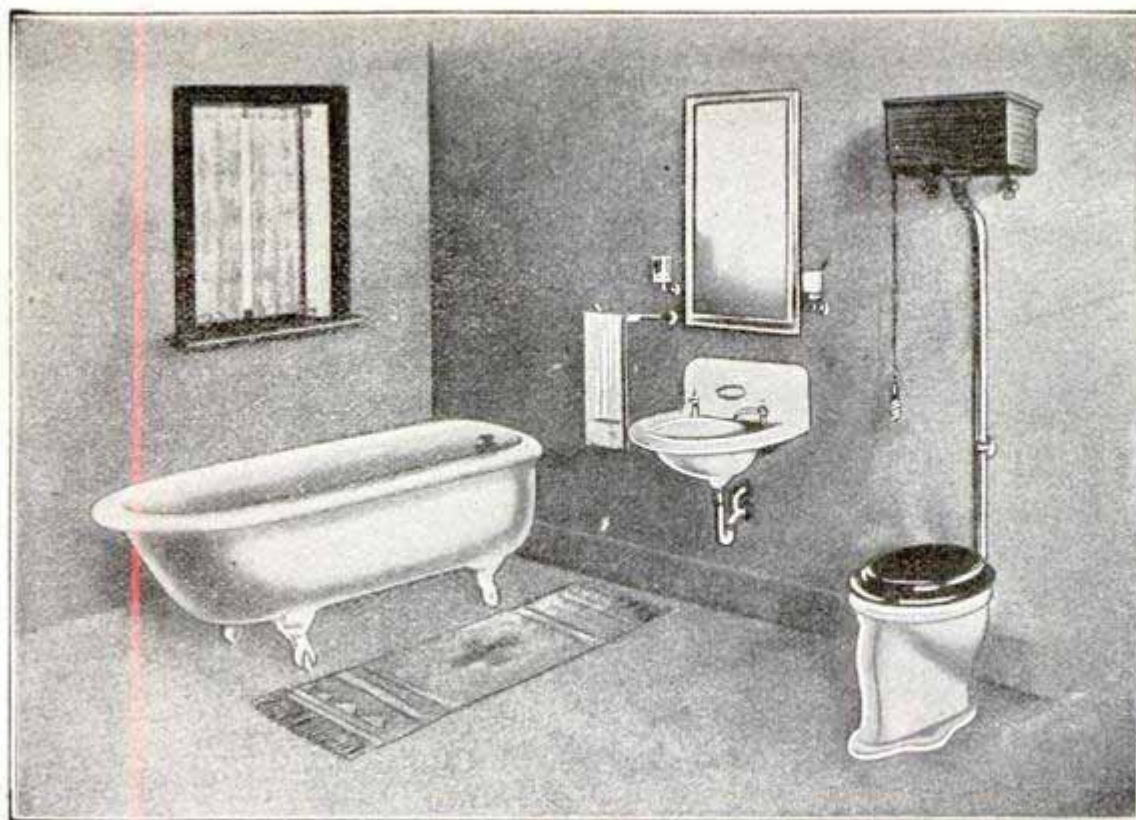
Armstrong's Hinged Vise

Slip the pipe in sideways *not* endways and save no end of time and trouble. Made of strong malleable iron, with finest crucible steel *interchangeable* jaws.

A vise like this will outlast two cheap vises and will not break at the time you need it most. Every shop needs one. Write for special circular.



The Armstrong Manufacturing Co.
 Bridgeport, Connecticut



Plumbing Material

DIRECT TO THE CONSUMER

At less than wholesale prices you also save the plumber's profit.

Send us a list of your needs. All we ask is an opportunity to figure on your wants.

We carry everything necessary for installing this class of work. Soil pipe, lead and water pipe and fittings of all kinds, etc., etc.

All Goods are Brand New, High Grade and Perfect.

Complete Bath Room Outfits only - - \$36.50
 White Porcelain Enameled 18 x 30 Sinks only \$ 2.00
 Laundry Tubs only - - \$5.00
 Bath Tubs only - - \$6.00

SEND US YOUR BILL FOR OUR ESTIMATE

WRITE FOR OUR FREE ILLUSTRATED **CATALOG No. 35**

CENTRAL MACHINERY & SUPPLY CO., 547-559 State St., Chicago, U. S. A.

GASOLINE SOLDERING IRON AND BLOW TORCH



DON'T THROW AWAY your valuable time with a poor tool. We make the best on earth. The price is right; let us prove it to you at our expense.

Shall we mail you our booklet?

EMMELMANN BROTHERS MFG. CO., INDIANAPOLIS, IND., U. S. A.

THE "ELECTRO RHEOSTAT-REGULATOR"

(Patent applied for)



Just out. The slickest rheostat ever offered. To dim down incandescent lamps, from 2-110 volts, to accurately reduce speed of small motors, to regulate current exactly for electroplating work, to tune small wireless plants, to regulate current of electrolytic coherers and 100 other uses. Other regulators put down current in STEPS only, ours cuts or raises it GRADUALLY. Resistance: 6 ohms.

Capacity with continuous load: 2 amperes. Price postpaid 75 cts. Our 64 page Electrical Cyclopeda just out. 100 experiments; instructions about wireless coils, etc., electrical photographs, valuable information and diagrams. It's FREE. Send for it to-day.

ELECTRO IMPORTING CO., 87 Warren Street, New York City

STAR HACK SAWS



Hack Saw Blades of all sorts and conditions are now being offered on the market. Some brands will cut a little of certain kinds of stock, others more and a larger variety of material. For every kind of work and a lot of it, the STAR blade is the correct thing. It never balks but is always ready to do the work required. While the price of the ★ may be a little higher than most other brands, it is, considering the amount of work it will accomplish, by far the cheapest in the end. Write for Catalogue "C."

MILLERS FALLS COMPANY
 28 Warren Street, New York, N. Y.

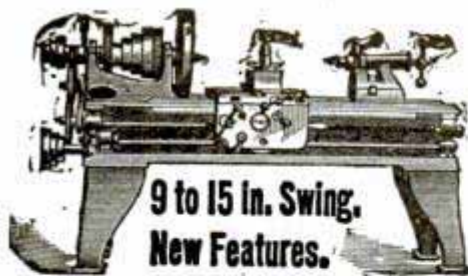
THE AMERICAN COMBINED LEVEL AND GRADE FINDER

Something Altogether New All progressive and up-to-date Mechanics, Machinists, Carpenters, Bricklayers, Masons, Plumbers, Millwrights, Road Supervisors, Track Foremen, Surveyors, Architects, Civil Engineers and others will find this an INDISPENSABLE INVENTION. A CIVIL ENGINEER THAT YOU MAY HAVE WITH YOU AT ALL TIMES.

The Most Practicable, Durable and Convenient Instrument of the Day

In addition to ordinary mechanical work the American Combined Level and Grade Finder will prove serviceable to all forms of grading, laying out roads, landscape gardening, placing of pipes for drainage, getting fall of water, getting grade of hills for automobilists, cutting of rafters, laying off and leveling buildings, getting height of any object, etc. Write for book of testimonials. Agents wanted on liberal terms. Apply at once to **EDWARD HELB, Railroad, Pa., Manufacturer**





9 to 15 in. Swing.
New Features.

If It's a Sebastian, It's a Good Lathe

BUILT UPON HONOR—ACCURACY, EFFICIENCY, MODERATE PRICES.

Foot and Power Lathes, all sizes. Send for Catalogue.

Sebastian Lathe Company, 107 Culvert St., Cincinnati, O.



The "KICKDRIVE" is for driving all kinds of light machinery by foot power. The following articles are built complete with the "KICKDRIVE":

Circular Saws, Polishing and Buffing Machines and Forges.

Get a Booklet

MAYER SLOTKIN, 210-212 A Canal St., NEW YORK, N. Y.

STEEL
BRASS
BRONZE

BALLS **BALL BEARINGS**

"Rnipe" Pat.

1/4 in. Shaft and up. No fitting, just push them on. 10 cts. In stamps for sample.

PRESSED STEEL MFG. CO.

454 The Bourse, Phila., Pa.

The Good
Old Reliable
Work Bench

That never gets out of style. For many years made exclusively by



C. CHRISTIANSEN, 792 Grand Avenue, CHICAGO

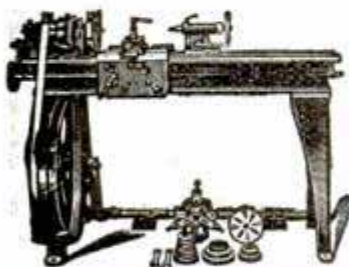
When You Want Anything and Don't Know Where to Find It, Write *Popular Mechanics*.

FOOT and POWER

AND TURRET LATHES, PLANERS SHAPERS AND DRILL PRESSES ::::

SHEPARD LATHE CO.

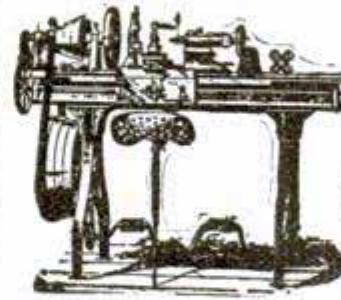
A131 W. 2d St., Cincinnati, Ohio



B. F. BARNES' ELEVEN-INCH SCREW CUTTING LATHE

For foot or power as wanted. Has power cross feed and compound rest. A strictly high-grade modern tool. We also build a 9-inch lathe. Descriptive circulars of each lathe upon request.

B. F. BARNES CO., Rockford, Ill.



LATHES

9 to 13 inch Swing

List price, \$65.00 and up according to size. When ready to buy send for Lathe Catalog and prices

W. F. & John Barnes Co.
100 Ruby St., Rockford, Ill.

While arguing to a state inspector that an exposed set screw on a shaft was not dangerous Henry Hubbard, of Chicago, was struck in the chest by the screw and received injuries from which he died. There is a bill before the Illinois legislature to compel manufacturers to have set screws buried in the shafts instead of being exposed.

"IT'S TIME FOR YOU TO GO."

By E. C. Chamberlain, of Troy, N. Y., Fire Department.

One night the wind howled mournfully,
The snow swirled round the door,
Bright lights shone through the windows
Of Steamer No. 4.

Within the crew of lusty lads,
In uniforms of blue,
Sat idly waiting duty's call,
Each heart was brave and true.

Suddenly there came a sound,
The creaking of a door,
As an old man, bent and feeble,
Stepped in upon the floor.

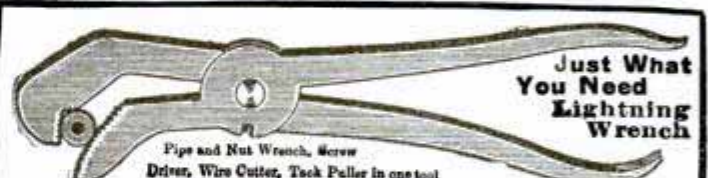
"No tramps allowed," one fireman cried,
"Just read the rules, they're clear.
Clause 3, upon the wall up there,
'Permit No Loungers Here.'"

In trembling tones the old man said,
"It makes me sad and sore,
Perhaps you don't believe it, boys,
But I once captained 4."

A hearty laugh rang through the room;
One dealt a stinging blow
By crying out, above the rest,
"It's time for you to go."

Once more the door swung open.
"The captain!" someone cried,
As a noble looking fellow
Stamped his foot and came inside.

(Continued on page 1270)



Just What
You Need
Lightning
Wrench

Pipe and Nut Wrench, Screw
Driver, Wire Cutter, Tack Puller in one tool

Ideal tool for mechanics, no adjustments. Works in places inaccessible with other wrenches. Strong and durable. Mailed postpaid. 6 inch nickel plated 38 cents, 7 inch 48c, 8 inch 58c, 12 inch 88c. Money back if not satisfactory. SPECIALTY MANUFACTURING CO., JAMESTOWN, N. Y.



LUFKIN
TAPES AND RULES

ARE THE BEST

FOR SALE EVERYWHERE SEND FOR CATALOG No. 26

THE LUFKIN RULE CO.

SAGINAW, MICH., U.S.A.
NEW YORK, LONDON, ENGL., AND WINDSOR, CANADA

THE OLD RELIABLE
JESSOP STEEL
IS YET ON TOP AND THE VERY BEST FOR ALL FINE TOOLS
WILLIAM JESSOP & SONS, LIMITED
91 JOHN STREET, NEW YORK

DIAMOND GIFTS

2198
\$25



2488
\$175

20% Down, 10% a Month

The few Christmas gift suggestions illustrated on this page will serve to show how really low our prices are. You can buy all your Christmas presents from us on credit and have nearly a year to pay for them. Our 64-year reputation for reliability is your guarantee of quality. Choose by number from the illustrations on this page, or send for large illustrated catalog number 3. We send all articles pre-paid, with privilege of examination. If your home jeweler can duplicate any diamond or piece of jewelry at the same price, we will take it back and return your money. Send for catalog number 3 to-day.

J. M. LYON & CO.

71-73 NASSAU STREET

NEW YORK

ESTABLISHED 1843

2126
\$175



2208
\$120



2317
\$25



2585
\$9



2271
\$100

2189
\$50



2380
\$25



2315
\$35



2179
\$400



2546
\$8



4083
\$50



2132
\$60



2110
\$35



2113
\$50



Let there be Light

RELIANCE ACETYLENE GAS GENERATOR

MAKES LIGHT
FOR THE
Home, Factory,
Church, School,
Etc.



Automatic Water-Shift — Water-Feed Valve

Reliance Generators are equipped with a rotary water-valve which, not being directly connected to the water feed-pipe conveying the water to the carbide, absolutely prevents the water from reaching the carbide until this valve is brought into operation, automatically, by the downward movement of the bell, which occurs when the gas becomes sufficiently low to require an additional supply. This positively prevents any waste of gas after lights are turned off.

WRITE FOR FREE ILLUSTRATED CATALOG

Giving full information regarding all styles of RELIANCE Generators.

The Gem City
Acetylene Generator Company
DAYTON, OHIO

Have you seen the New Improved BUCKEYE TRACTION DITCHER?



Sold to contractors on 6 days' test before asking for settlement.

Works in hard pan and shale rock, where it can be taken out with the ordinary pick. Passes over the work but once, cutting to a perfect grade if desired.

Write for catalog H, also reprint article giving cubic yards Ditcher will handle per day and the cost of operating.

Read the following testimonial:

24" x 7½' Machine.

CANADA

Pincher Creek, Alta, Can., 7th March, 1906.

The Buckeye Traction Ditcher Co., Findlay, O.

Gentlemen:—After using for four months the 24 in. x 7½ ft. Ditcher I purchased from you, I am able to give you the following results:

In good loam the machine can average 1,500 feet of 6 foot ditch per 10 hours, including delays and stops. In hard, dry clay that leaves a polish on the sides the machine can be counted on to cut 900 feet per day. In gravel the size of a man's fist it will dig 750 feet per day; numerous stops are required to pick the stones that may roll into some part of the machinery.

I have dug in ground composed of gravel and boulders larger than a man's head, but it is not economical. I am satisfied that the machine will do the work of 100 men at one-tenth the cost of hand labor.

Yours truly,

J. E. Woods, C. E.

The Buckeye Traction Ditcher Co., Findlay, O.

SHARPEN YOUR TOOLS

You can save trouble and save time, you can do better work with less effort if you have in your shop or home a



PRACTICAL GRINDER

It will sharpen any edged tool in one tenth the time that an ordinary grindstone will sharpen it. The alundum wheel will not heat the metal and take the temper out either. We guarantee that. Clamp it on table or bench, hold knife or tool *lightly* on grinding wheel and turn. That's all. Any one can do it.

Uniform wheels for general purpose work—special beveled wheels for certain styles of implements.

A NECESSITY IN THE SHOP

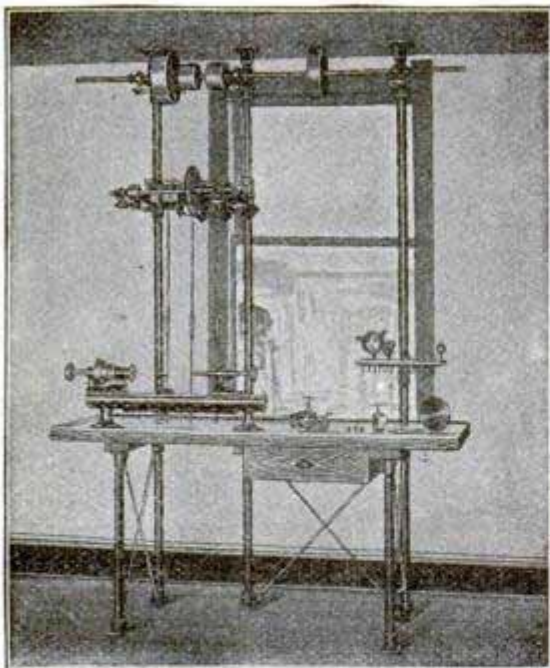
A time and bother saver in the home. Nothing to get out of order, no water necessary, no chain to buckle or belt to break. Small and portable, will save its cost in a week when drills and tools are carried out of the shop on outside work.

SEND FOR FREE BOOK

Practical Talks About Practical Grinders. It will settle the dull tool and dull knife business for you. Ask your dealer or send to us direct.

ROYAL MANUFACTURING COMPANY
133 E. Walnut Street, - Lancaster, Pa.

CATARACT



A COMPLETE MACHINE SHOP is attained suitable for all kinds of repairing, experimental work or tool making, by having the NEW CATARACT PRECISION LATHE and ATTACHMENTS, made complete, applicable to a room in your home, a manufacturing plant or tool room. This is a revelation few mechanics are aware of, and is the most practical, universal and interchangeable outfit ever designed. If interested send for further information and complete catalogue.

MANUFACTURED BY

HARDINGE BROS., 1034-1040 Lincoln Avenue, CHICAGO, U. S. A.
ESTABLISHED 1890



\$3,000 to \$10,000
A YEAR IN THE
REAL ESTATE
BUSINESS.

We will teach you by mail the Real Estate, General Brokerage, and Insurance Business, and appoint you

SPECIAL REPRESENTATIVE

of the oldest and largest co-operative real estate and brokerage company in America. Representatives are making \$3,000 to \$10,000 a year without any investment of capital. Excellent opportunities open to YOU. By our system you can make money in a few weeks without interfering with your present occupation. Our co-operative department will give you more choice, salable property to handle than any other institution in the world. A THOROUGH COMMERCIAL LAW COURSE FREE TO EACH REPRESENTATIVE. Write for 62-page book, free. THE CROSS COMPANY, 914 Reaper Bldg., CHICAGO, ILL.

(Continued from page 1268)

"So you were once a fireman here?"

The new arrival smiled,
"Then reel us off a yarn or two,
And warm yourself the while."

"Thanks; that I will," the old man said.
"My story's straight and true;
'Twas back when men wore shirts of red,
Not like your's now of blue.

"Back in the days when men fought fire
Not for the love of gold,
But to gratify that longing strange
A-burning in the soul.

"One night when I was captain, boys,
We volunteers sat round,
A-longing for the bell to strike,
We used to love the sound.

"Then, sure enough, we got our wish,
She clanged off 41;
And out through this same door we went
With horses on the run.

"I can see the blazing tenement,
And hear the cries up high;
All of you have seen such sights,
And feared not then to die.

"Well, Bill, a bunker, grabbed an axe;
I quickly did the same.
And up those creaking stairways
We dashed with might and main.

"Through clouds of smoke we groped our way,
And cringed not at a flame,
For lives were stakes and hearts the trump;
It took stout hearts to gain.

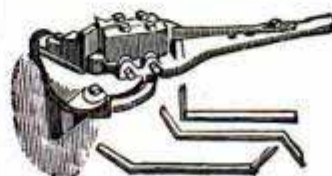
"For just one minute I missed Bill,
It seemed an awful while;
Then through a shower of sparks he reeled,
And handed me a child.

"'For God's sake run,' he fairly shrieked,
'There's a mother here, I know;
Don't fear for me, for I'll get her;
It's time for you to go.'

"Yes, time for me to go, boys,
That's why those words strike home.
They were the last Bill uttered,
For I reached the street alone.

"Why, what's the matter, captain?
Did my story make you sad?"

"Yes," sobbed the man in shirt of blue,
"Your friend Bill was my dad."



ANGLE BENDERS

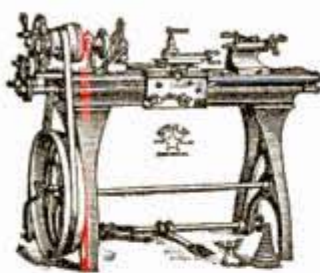
We make hand-power Benders for forming angles in stock, 1 inch thick and under. Light stock can be bent cold.

Wallace Supply Co., 24 W. Washington St., Chicago, Ill.

"Star" Lathes

Foot or Power

9-in. to 16-in. swing



High-grade screw-cutting engine lathes, with or without compound rest, taper, draw-in chuck, milling and gear-cutting attachments, friction countershaft, metric lead screw, etc.

(m-1) Send for catalog "B"

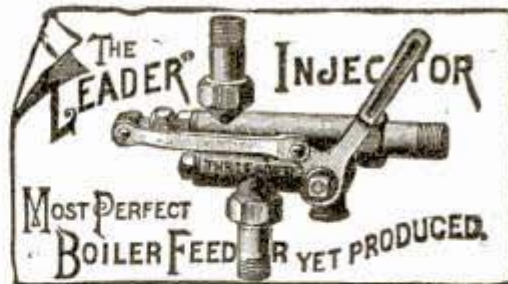
The Seneca Falls Mfg. Co.

102 Water St., Seneca Falls, N. Y., U. S. A.

SIMPLE?

Simplicity Itself!
To start or stop, simply turn on steam and throw lever.

NO WAITING
NO ADJUSTMENTS



NO COMPLICATIONS
ALWAYS RELIABLE

Manufactured only by

THE RANDLE MACHINERY COMPANY

1761 Powers Street,

Cincinnati, Ohio

EMERGENCY PIPE CLAMP



To Repair Splits and Rust Holes in Pipes

Made of malleable iron, all sizes, 1/2 in. to 12 in. Send for CATALOG on Pipe Repairs.

JAMES McCREA & CO., M'rs.
63 W. Washington St., Chicago

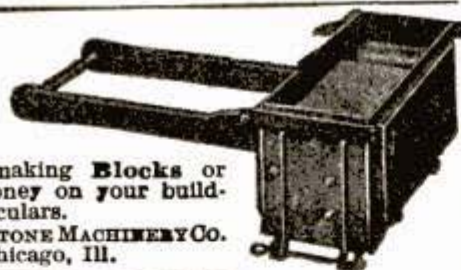
HOW TO MAKE MONEY



Send today for our FREE book and descriptive matter telling all about the profits that can be made in the manufacture of concrete building blocks. With a FRANCIS BLOCK MACHINE any man of ordinary ability can make from \$5 to \$15 a day. No capital or experience necessary. Building blocks made with the Francis Machine under the Berlin System are guaranteed damp proof, frost proof, fire proof and will not crack or crumble. Contractors and builders in your town need your entire output. Write today.

FRANCIS MACHINERY COMPANY
Room 40, 710 N. 8th Street St. Louis, U. S. A.

Cement Machines



Big money in making Blocks or Bricks. Save money on your buildings. Write for circulars.

CHICAGO CEMENT STONE MACHINERY CO.
North Chicago, Ill.

The POPULAR EMERY GRINDER



A Practical Tool

for blacksmiths, plumbers, carpenters, farmers and mechanics of all trades. It is strong, durable and simple in construction.

Wheel is 6 inch diameter, 1 inch face, and made of best abrasive material for sharpening tools. Makes 3,000 revolutions per minute.

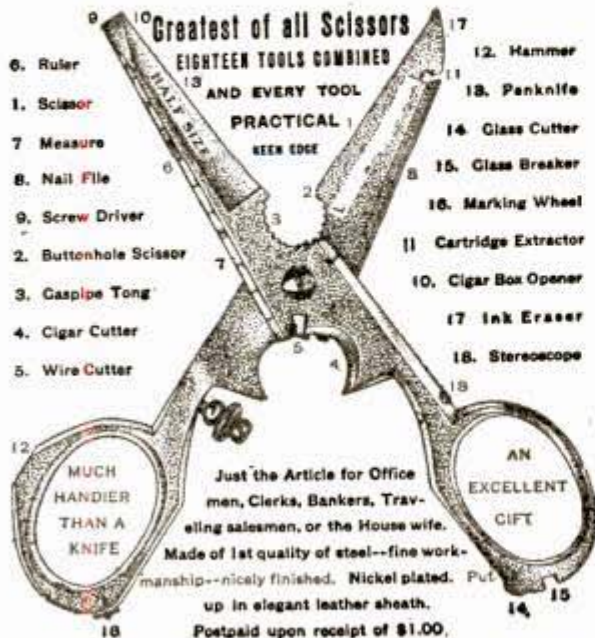
Tool-rest may be adjusted to give any desired bevel.

Can be carried in small box and set up anywhere in field or shop. No belts, cogs or lost motion. Buy it, try it, and if you don't like it, send it back.

PRICE \$3.50

Mechanics Tool Works

185 Dearborn Street, - CHICAGO, ILL.



Greatest of all Scissors
EIGHTEEN TOOLS COMBINED
AND EVERY TOOL
PRACTICAL
KEEN EDGE

- | | |
|-----------------------|-------------------------|
| 6. Ruler | 12. Hammer |
| 1. Scissor | 13. Penknife |
| 7. Measure | 14. Glass Cutter |
| 8. Nail File | 15. Glass Breaker |
| 9. Screw Driver | 16. Marking Wheel |
| 2. Buttonhole Scissor | 11. Cartridge Extractor |
| 3. Gaspipe Tong | 10. Cigar Box Opener |
| 4. Cigar Cutter | 17. Ink Eraser |
| 5. Wire Cutter | 18. Stereoscope |

MUCH HANDIER THAN A KNIFE

Just the Article for Office men, Clerks, Bankers, Travelling salesmen, or the House wife.

Made of 1st quality of steel--fine workmanship--nicely finished. Nickel plated. Put up in elegant leather sheath.

AN EXCELLENT GIFT

Postpaid upon receipt of \$1.00.

WM. C. HOCKING & CO., 152 Lake St., Chicago

EUGENE DIETZGEN COMPANY

181 Monroe Street, CHICAGO
214-220 E. 23d St., NEW YORK

SAN FRANCISCO



NEW ORLEANS

Most complete line of Drawing Materials and Surveying Instruments

Our Rapid Printing Blue Paper has no equal. The Celebrated Vandyke Solar Paper for Blue and Black line prints. Send for sample prints.

ALL GOODS WARRANTED

WRITE FOR CATALOG "P"--480-pp, PROFUSELY ILLUSTR'D.



GLASSES ARE NEEDLESS

in most cases. For weak eyes they are crutches—not a cure. For diseased eyes they are useless. Only a gentle *medicated massage* can strengthen weak eyes and cure optical diseases. The

NATURAL SIGHT RESTORER

applies a *soothing, strengthening* treatment that is *healing but harmless*; gently exercises the proper muscles and makes weak eyes strong by proper massage. *Brings eye-health* by aiding nature. *Young or old* treated at home and normal eye-sight secured for the cost of a pair of glasses. Don't wear "specks," but write today for our free illustrated book. *If we can't help you, we will say so.*

The Natural Sight Restorer Co.

104 Broadway :: Detroit, Michigan



THIS THEN IS TO ANNOUNCE THAT

STANDARD

We manufacture a **LIGHTING SYSTEM** for lighting Factories, Shops, Stores and Homes, that is far superior and more economical than either Gas or Electricity.

Burns Gasoline or Alcohol.

In sending for our description and illustrated catalogue, please send us a rough draft, giving dimensions of your factory, shop, store or home and we will cheerfully send you an estimate for lighting, together with a few facts which will, at least, cause you to stop and think.

HYDRO CARBON LIGHT

STANDARD LIGHTING SYSTEM
MADE BY
STANDARD
GILLETT LIGHT COMPANY
CHICAGO, U.S.A.

**ECONOMICAL, SAFE AND DURABLE
A CHILD CAN OPERATE THIS SYSTEM**

THE STANDARD-GILLETT LIGHT CO.

932 No. Halsted St.,
CHICAGO, U. S. A.

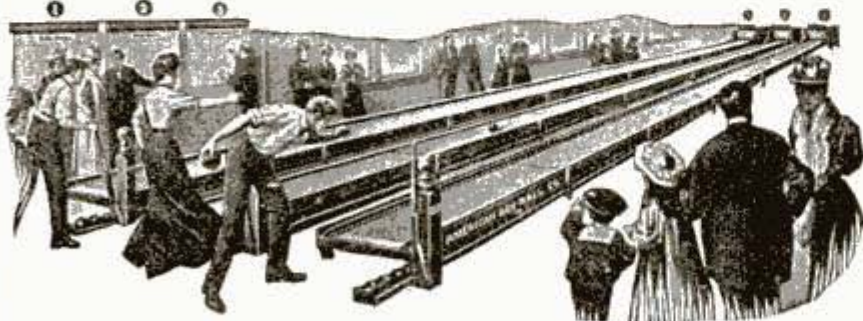
MARKET FOR OLD TINFOIL.—Save and sell your tinfoil. The recent rise in the price of tin has led to a curious development in this and other countries. Several of the best known chocolate manufacturers on the Continent have issued the following notice: "Do not throw away the tinfoil in which the chocolate is enveloped. It is composed of pure metal, a metal which is dear. Keep it, and before long it will be called for by our agents, who will pay for it at its market value. The chocolate industry in Europe spends nearly \$4,000,000 per annum in tinfoil, and these \$4,000,000 are generally thrown to the winds." It is further explained that the present high price of tin is due to the action of English and Dutch speculators, who have forced it far beyond its actual value.—Metal Worker.

EAGLE CAUSES FIELD FIRE.—A huge American eagle was the unwilling cause of a disastrous conflagration, that consumed 800 acres of fine pasturage in Kern County, California. The bird alighted upon a highly charged transmission wire belonging to a power company. In some unknown manner it caused a short circuit. Instantly it broke out into a mass of flames and fell to the ground beneath, where it communicated the fire to some stubble. From this the flames quickly passed to the pasture land, which they completely stripped of vegetation. The charred body of the bird is now on exhibition at the ranch where it did so much damage.

A TON OF FLIES.—You have often wondered what flies are good for. Here is the answer—\$700 a ton. That is, 166 cu. ft. of flies, or 15 lb. to the bushel, yet they were actually shipped from Brazil recently and delivered at a London dock at that price. As there are almost no flies in England, and as they are highly prized for chickens and captive birds and fishes, the delicacy is imported from Brazil, where they are, so to speak, a drug on the market. The favorite hunting place is the River Amazon. All the fly-hunters need to do is to float with the stream and scoop the insects out of the air by billions. The fly market is quite active, a strong demand having trebled the prices in a few years.

\$9,000 FOR A NEW FUEL.—That is what the Automobile Club of Paris, France, is willing to pay to the man who invents a new fuel for automobiles. It must be cheaper than gasoline, give good results, and must be adaptable to the present machine without any serious changes. The club's technical commission has been ordered to draw up rules and will have charge of all the tests.

\$513.00 Clear Profit in 51 days from an investment of \$150.00



Is the result from the operation of one American Box Ball Alley in Sullivan, Ind. Why not go into this business yourself? It is the most practical and popular bowling game in existence. It will make big money in any town. These alleys pay from \$25.00 to \$65.00 each per week. This is no gambling device, but a splendid bowling game for amusement and physical exercise. Liberally patronized by the best people of both sexes. Quickly installed, conveniently portable. No pin boy needed. Receipts are nearly all profit.

More than 3,000 already sold. We sell on payments, and our catalog is free. Write for catalog.

AMERICAN BOX BALL COMPANY, Patentees, 1375 Van Buren Street, INDIANAPOLIS, INDIANA

Please Mention Popular Mechanics

A Comparison



Perspiration cannot affect Litholin water-proofed linen collars or cuffs. They keep their perfect shape in all weathers.

Moisture will immediately will the best of ordinary linen collars and cuffs—the button-holes break, and they crack and fray.

LITHOLIN Water-Proofed Linen Collars and Cuffs look exactly like linen because they are linen. Save time, worry, expense, and increase comfort. Wiped with damp cloth they are as clean and white as when new.

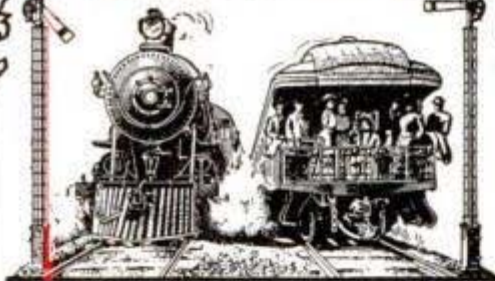
Collars 25c. Cuffs 50c.

If your dealer has not them in stock, send style, size, number wanted, with remittance, and we will mail post paid. Illustrated catalogue of all the latest fashionable styles, free on request.

The Fiberloid Company, Dept. 25
7 Waverly Place, New York

LITHOLIN

WATERPROOFED LINEN.



COMING AND GOING

ALWAYS USE

"The Only Way"

NO DIRT
NO DUST



NO SMOKE
NO CINDERS

GEO. J. CHARLTON,
GENERAL PASSENGER AGENT
CHICAGO.

Pay Now & Then



Let us send you Watch or Ring upon terms indicated. Remit first payment with order or have goods shipped for inspection C. O. D. first payment.

Our Attractive Catalog Free.
Ask For No. 0 71

1/2 carat commercial white perfect diamond set in 14-kt. solid gold mounting **\$30.00**
\$5 cash and \$3 per month.

Gents' O. F. 12, 16 or 18 size or ladies' 6 size plain or heavily engraved 23-year, 14-kt. gold-filled case fitted with genuine new Elgin or Waltham movement **\$12.50**

With hunting case, \$16.75. \$2.00 cash and \$1.50 per month.

Herbert L. Joseph & Co.

Diamond Importers :: Watch Jobbers
217-219 [0 71] State Street, CHICAGO

NO MONEY DOWN **MEN'S SUITS** **\$1.00 A WEEK**
ON CREDIT

Buy Men's Suits, Overcoats and Raincoats direct from our factory by mail



For \$15 and \$18

We require no security and we trust any honest person anywhere in the United States.

We send garments on approval—you don't pay a penny 'till you get the clothes and find them satisfactory—then pay \$1.00 a week.

We are the pioneers and twice over the largest Credit Clothiers in the world. We operate 73 stores in the principal cities of the United

States and have over 500,000 customers on our books.

FREE Send today for our fine line of Fall and Winter samples. Self measurement blank, tape and full particulars of our convenient payment plan—all free to you.

Commercial rating \$1,000,000.

Menter & Rosenbloom Co.

220 St. Paul Street Rochester, N. Y.

DON'T BUY GASOLINE ENGINES

Until you investigate "The Master Workman" a two-cylinder gasoline, kerosene or alcohol engine, superior to any one cylinder engine; revolutionizing power. Its weight and bulk are half that of single cylinder engines, with greater durability. Costs Less to Buy—Less to Run. Quickly, easily started. Vibration practically overcome. Cheaply mounted on any wagon. It is a combination portable, stationary or traction engine. SEND FOR CATALOGUE.

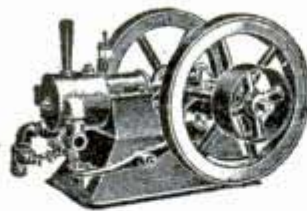
THE TEMPLE PUMP CO., Mrs., Meagher and 15th Sts., Chicago. THIS IS OUR FIFTY-THIRD YEAR

No Better Gas or Gasoline Engines made than the

FOSS ENGINES,

Simple, Substantial, Efficient. Catalog on request.

Foss Gasoline Engine Co., Kalamazoo, Mich.



GOES LIKE SIXTY
SELLS LIKE SIXTY
SELLS FOR SIXTY

\$60

GILSON GASOLINE ENGINE

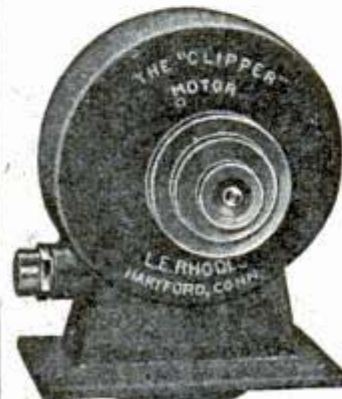
For Pumping, Cream Separators, Churns, Wash Machines, etc. *FREE TRIAL. Ask for catalog—all sizes

GILSON MFG. CO. 26 Park St. Port Washington, Wis.

"GET THE BEST"

which means

The Clipper Water Motor



We do not claim it THE CHEAPEST, but we do claim it THE BEST.

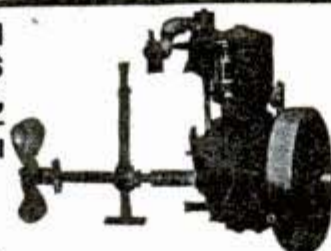
Buy one for the boy and watch him "get busy." Send for circular with full description and price.

L. E. RHODES
HARTFORD, CONN.

High-grade MARINE and AUTOMOBILE ENGINES 2 to 30 H. P. c 2 and 4-cycle, latest improvements; best material; lowest prices. Also sell castings, with drawings.

State your want.

HOULE MOTOR WORKS,
580 East St., Holyoke, Mass.



If your water pressure is 25 lbs. or over, buy a **WATER MOTOR, 5-in., \$2⁵⁰**

Larger Sizes Proportionately Low

Attach to any faucet, and will run fan, lathe, sewing and washing machine, air compressor, etc., etc. Reliable agents wanted.

A SAMPLE MOTOR FREE

to the right person in each town. Write for terms, stating water pressure.

ENGINEER WANTED

to send for catalog of Indicators, Reducing Wheels, Planimeters. Address,

LIPPINCOTT M. S. CO.,
Newark, :: :: New Jersey



BUSINESS BEFORE PLEASURE.—A young woman on the North Side uses a telephone on a party line, says a Chicago paper. The other morning she wanted to call up her dressmaker, who lives on the South Side. It was most important. She had an unexpected invitation to a dinner, and she wanted to hurry a chiffon creation that was in process of building.

"Hello," she said. "Give me Calumet 1592. Hello, Calumet 1592. Calumet 1592—"

Then suddenly a heavy masculine voice with an unmistakable German accent broke in: "Hello, Central, I want—"

"Hello," interrupted the girl, "I'm using this line. Please keep off."

"But, madam, I will reimburse you, but I want to use the telephone. I—"

"Please keep off, I'm using it."

"But, madam, I will reimburse you."

"I don't want to be reimbursed. I want to use the telephone."

This dialogue continued for a few minutes without variety, and then the man lifted his voice above the girl's: "Oh, madam, I will reimburse you, but I must use the telephone now, mein house is on fire."

WOMEN INVENTORS.—Women are stepping at a lively gait into the field of invention. There are many successful devices patented in the names of women, and a few of these have made large returns to their inventors.

One woman had offered to her as soon as it was patented \$20,000 for her device of a satchel-bottomed paper bag. The glove fasteners which have almost superseded the old-fashioned buttons and button holes are the invention of a woman.

Domestic utensils naturally attract the ingenuity of women, and there are flatirons, pie tins, ovens, stoves and baking dishes which are paying their originators well from every day in the year sales.

But women are not confined to any field. "No pent up Utica contracts their powers."

A letter box with a signal for the postman when there is a letter in the box is one of woman's inventions. Another woman has invented an embalming fluid for undertakers—growsome thing to think about. There are pages of women's names in the patent office reports. There are wheels, locks, brakes, alarm clocks, fire escapes and all sorts of patents issued to women.—Chicago Journal.

ARC LIGHT IN ROLE OF FOOL KILLER.—Electricity in a great many instances has acted the role of "Fool Killer," but the climax was reached when Joseph Gooden, of Ogdenburg, N. Y., pulled a street arc lamp down to the level of his face and attempted to light his cigar against a carbon. Gooden's light went out forever, but the arc lamp glimmered and glimmed until sunrise in seeming self-approbation.

This one is from Harper's Monthly: Patrick, lately over, was working in the yards of a railroad. One day he happened to be in the yard office when the force was out. The telephone rang very vigorously several times, and he at last decided it ought to be answered. He walked over to the instrument, took down the receiver and put his mouth to the transmitter, just as he had seen others do.

"Hello!" he called.

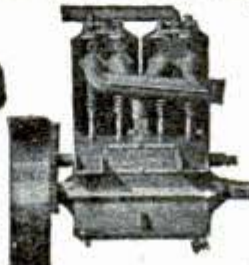
"Hello!" answered the voice at the other end of the line. "Is this eight-six-one-five-nine?"

"Aw, g'wan! Phwat d'ye think Oi am—a box car?"

MOTORS

For Marine and Vehicle Use

Williamson Motor Co.

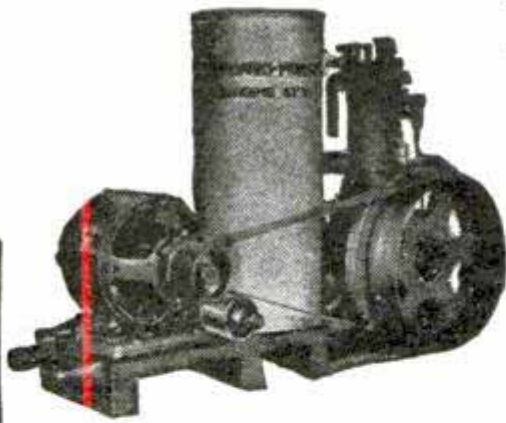


1½ to 60 H. P. (Air and Water Cooled)

Experimental Work Solicited

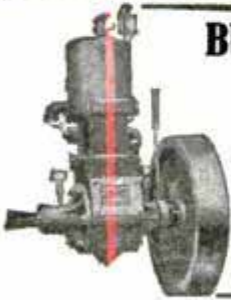
8-12 S. 39th St., Phila., Pa.

Make Your Own Light



THE FAIRBANKS-MORSE Electric Light Outfit gives plenty of good light at a moderate cost. Gas, Gasoline or Kerosene Engines for all purposes, from 2 h. p. up. Send for illustrated Catalogue No. C 449 Gasoline Engines.

Fairbanks, Morse & Co.
Monroe Street, Chicago, Ill.



BUILD YOUR OWN MOTOR!

Complete sets of Castings, with blue print working drawings, for your Auto, Launch or Motor-Cycle Engine.

Our Remarkable Offer!

6-Actual Brake Horse Power—2 Cycle—3 Port Engine. \$100 complete with accessories. IT'S GUARANTEED! We sell Blue Print Working Drawings—2 or 4 Cycle. Send for Catalog.

THE GERHARDT MOTOR CO.
27th Street, above Dauphin, Philadelphia, Pa.

1½ H. P. \$58⁰⁰

Look at the Neat Design!

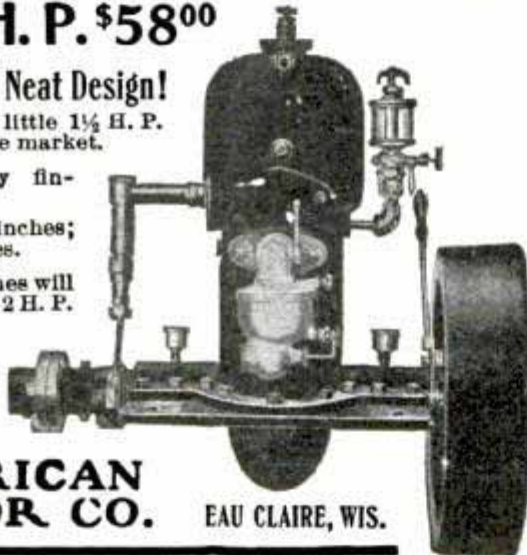
The finest little 1½ H. P. Engine on the market.

Handsomely finished.

Bore 3¼ inches; stroke 3 inches.

These engines will develop over 2 H. P.

Write for Catalog "P" of 1½ to 16 H. P. Motors.



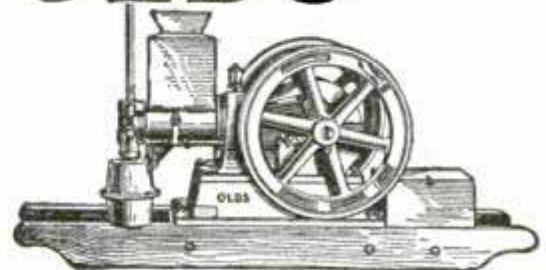
AMERICAN MOTOR CO. EAU CLAIRE, WIS.

WHEN YOU WANT ANYTHING

AND DON'T KNOW WHERE TO FIND IT

WRITE POPULAR MECHANICS

OLDS ENGINES



"Best by Every Test"

—U. S. Gov't Report

You take no risk in buying an Olds Engine, because you are protected by the strongest guarantee made by any engine maker.

It is the lowest priced good engine made by a factory 25 years in the business.

There is an agent near you to see that everything is right and kept so.

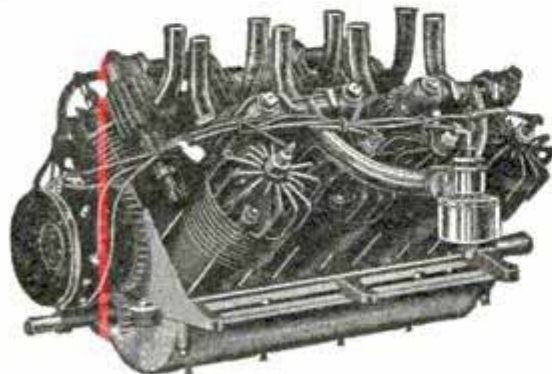
We have a liberal proposition to anyone wanting a good engine.

Be sure to write us about it before you buy elsewhere.

Send for our catalog showing Type A Engines, 3 to 8 h. p. and Type G 8 to 50 h. p. for gasoline or distillate.

OLDS GAS POWER CO.

Main Office, 955 Chestnut St., Lansing, Mich.
Boston—69-75 Washington St., N
Binghamton—23 Washington St. Philadelphia—1816 Market St.
Kansas City, Mo., 1226 11 h St. Omaha, Neb., 1618 Farnum St.
Minneapolis, Minn., 313 S. Front St.



30 HORSE POWER, 8 CYLINDER
WEIGHT 150 LBS.

Airship Motors and Engines for Mechanical Devices

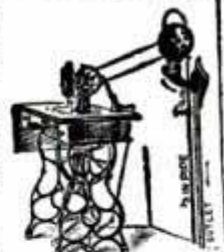
Where light weight and great power are required. 3½ to 40 horse power air cooled motors. Larger motors to order. Send for Catalogue C. Our motors have been adopted by the United States War Department.

G. H. Curtiss Manufacturing Co.
Hammondsport, N. Y.

!!This "Ad" worth \$1.00 to you!!

Cut this card out during October and November and send it with the balance in cash of the amount of your order (total amount of order to be not less than \$5.00). If \$5.00 order, then \$4.00 cash and this card. If \$10.00 order, then send \$5.00 and this card. In other words, we will allow 20% discount during October and November only. Send for Circular of Water Motors. Copyrighted Booklet, postpaid, 10c.

A. ROSENBERG MOTOR & MFG. CO., Dept. P.M., BALTIMORE, MD.



Perfection

MARINE MOTORS

2 H. P. \$45 complete

Positively the simplest, quietest and most powerful two-cycle marine engines built; and better fitted and finished finer than any other at any price

Reversible—No Cranking

No valves nor cams. Hi-hest grade material throughout. Our broad GUARANTEE covers replacement of any engine that does not give complete satisfaction and is backed up by the largest and most complete factory in the business. Can you afford to take chances or buy on any other terms? Price includes everything ready for installing except gasoline tank and piping.

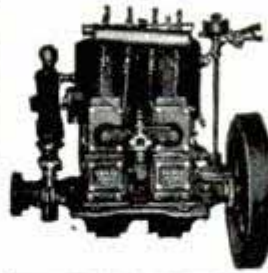
Handsome catalogue illustrating and pricing all sizes FREE.
The Caille Perfection Motor Co.
141 SECOND AVE., DETROIT, MICH.



REVERSIBLE MARINE ENGINES

1½ to 30 H. P.

Send for Catalog. Prices right.



TERMAAT & MONAHAN CO.
Oshkosh, Wis.

BEST TO CHEER UP.—There had been a dreadful flood in Missouri. The old fellow, who had lost nearly everything he possessed, was seated on the roof of his house as it floated away. He was gazing pensively out over the waters when a man in a boat approached.

"Hello, Bill."

"Hello, Sam."

"All your fowls washed away. Bill?"

"Yes; but the ducks can swim," replied the old man, with a faint smile.

"Peach trees gone, too, eh?"

"Well, they said the crop would be a failure, anyhow."

"I see the flood is away above your windows."

"That's all right, Sam. Them windows needed washin', anyhow."

Everybody's kickin',
Kickin' 'bout the heat;
Kickin' 'bout the prices
We pay for things to eat.
Kickin' 'bout the railroads
An' the government;
Kickin' 'bout the taxes
An' the way they're spent;
Kickin' 'bout the autos
An' the pace they set;
Kickin' 'bout the grafters
An' the pull they get.
Old mule looks dejected,
Says in tones demure,
"When it comes to kickin'
I'm an anaachoor!"

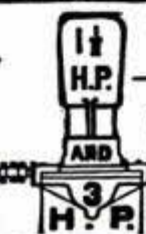
—Washington Star.

PACIFIC CABLE BREAKS.—The break in the Pacific cable of the Commercial Cable Company, somewhere between the relay station at Midway Island and Guam, September 20, is believed to have been caused by a subterranean earthquake. The cable is the only one connecting America with the Orient.

A bag of two or three thicknesses of flannel tied over the nozzle of the tap is a certain preventive of iron spots on negatives and prints. It is also an excellent splash preventer. The stream from it will fill a bottle without waste, when the direct unchecked stream is too wide or violent.—American Photograph.

DYNAMO - FUEL-GASOLENE-

ENGINE-SETS OIL-ALCOHOL



THE BUFFALO MECHANICAL & ELECTRICAL LABORATORY.

201 ERIE COUNTY BANK BLDG., BUFFALO, N. Y., U. S. A.

\$49 Little Giant

3 to 5 H. P. (BARE)

GASOLINE MOTORS

Guaranteed for One Year.

Our Free Catalog C4 is worth your having.

Send 10 cents in stamps for our book "Ignition, Vaporization, Installation and Operation of a Motor."

UNITED MFG. CO., DETROIT, MICH.

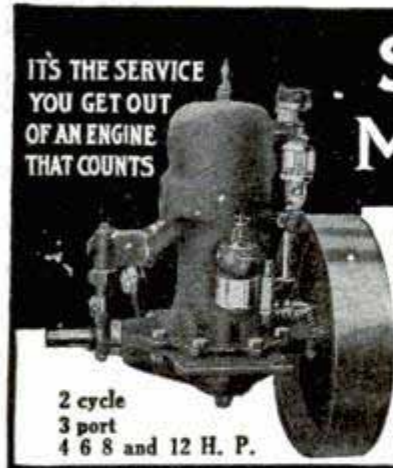


IT'S THE SERVICE YOU GET OUT OF AN ENGINE THAT COUNTS

Stover Motors

Easy to start. Develop full power. Run quietly and smoothly. Nothing "trappy" in their appearance. Nothing complicated. Not a "cheap" motor, but a low priced one. Write for catalogue and prices to STOVER MOTOR CAR CO., Freeport, Ill.

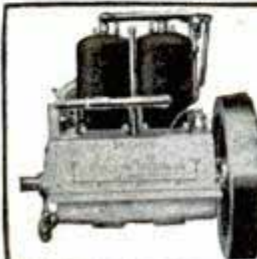
2 cycle
3 port
4 6 8 and 12 H. P.



SCRIPPS

The most trustworthy of 4-cycle Marine engines, and the ONLY strictly high-class engine selling at a reasonable price. Unusually simple, no cranking, economical, handsomely finished. 2-cylinder, 8-10 H. P. 4-cylinder, 15-20 H. P. Write for catalog.

Scripps Motor Co.,
602 Trumbull Ave., Detroit, Mich.

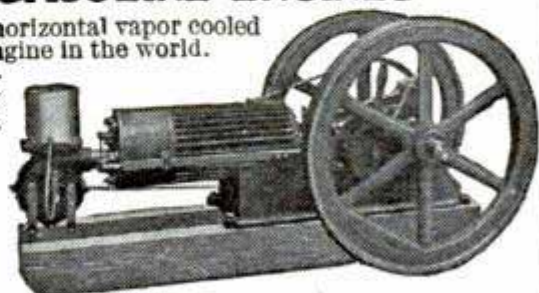


WATERLOO VAPOR COOLED GASOLINE ENGINES

The only horizontal vapor cooled gasoline engine in the world.

Absolutely frost proof and cannot freeze.

Patented May 15, 1906



The king of all gasoline engines. Our catalog will tell you all about them, also our power and sweep feed grinders. Send today.

WATERLOO GASOLINE ENGINE CO.
1021 Cedar Street Waterloo, Iowa

DU BRIE Marine Motors

A High Grade Engine at Reasonable Price.

Made complete in our own factory with best modern machinery by skilled mechanics under experienced direction, resulting in a **PERFECT ENGINE** for YOU.

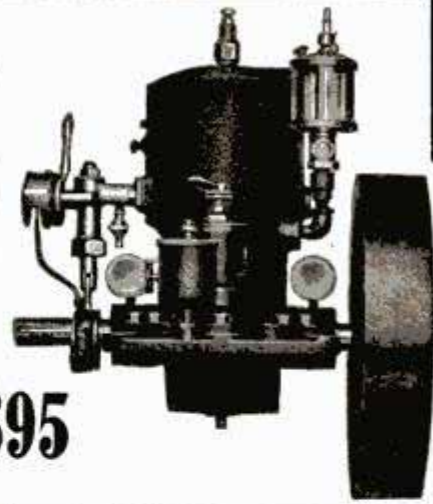
The present is a particularly favorable time to order. Send for Catalogue and find out why.

Ten Sizes 2½ to 27 H. P.

DuBrie Motor Co. 2½ H. P. \$60, 6 H. P. \$95

425 Guoin Street, Detroit, Mich.

Complete Equipment



Gies Reverse Gear
Successor to the reversible propeller **Solves the Reversing Problem.**

Gives absolute control of the motor-boat at 1 times.
1 to 80 H. P.—\$15 to \$90.
More made and sold than all other reverse gears combined.
Catalogue on request.
GIES GEAR COMPANY, Detroit, Mich.



The ECONOMIZER
carries any load up to 2 h.p.

That name means something. Five years' sales and not a single dissatisfied customer, means something. It's all in the engine—no shoddy goods. Want to know more?

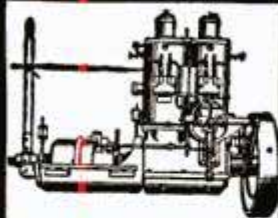
Address,

H. L. CHAPMAN, Lock Box 595, Marcellus, Michigan

Gas and Gasoline Engines

For all power purposes. Electric light plants from 10 to 2000 lights. Engines from 1 to 250 H. P. New or 2d hand. Write us for prices.

Empire Machine Works, 210 3d Avenue, PITTSBURG, PA.



THE MIETZ & WEISS
OIL AND GAS ENGINES

Stationary, 1 to 150 H. P.
Marine, 1 to 120 H. P.

Over 30,000 H. P. in operation.

GENERATOR SETS, PUMPS,
HOISTS, ETC.

A. MIETZ, 128-138 Mott St. New York

SEND FOR CATALOGUE P. N.

BUILD YOUR OWN BOAT

BY THE **BROOKS SYSTEM**

Of Full Size Patterns and Illustrated Instructions

You need no tool experience—no previous knowledge of boats. Our big free catalog gives hundreds of testimonials—tells how a profitable boat building business may be established. Send for it. We sell knock-down frames with patterns to finish for less than it costs others to manufacture. 21,311 inexperienced people built boats by the Brooks System last year. Why not you?

SATISFACTION GUARANTEED OR MONEY REFUNDED.

BROOKS BOAT MFG. CO.

ORIGINATORS OF THE PATTERN SYSTEM OF BOAT BUILDING.
3711 SHIP ST. SAGINAW MICH. U.S.A.



KNOCK DOWN FURNITURE



You Save ¾ the Cost

By putting together and finishing it at home. We furnish it—art and mission designs—heavy solid oak—every piece fitted and smoothed—includes stain and fastenings. You save ¼ manufacturing cost—¼ the freight and all dealers' profits.

Send trial order for this \$4 chair. Bottom cushion cover of leatherette, \$1.50. Particulars of other pieces sent on request.

BROOKS MFG. CO.

ORIGINATORS OF THE K. D. SYSTEM OF HOME FURNISHING.
3711 SHIP ST. SAGINAW MICH. U.S.A.



New Portable Gasoline Submerged Propeller

Lightest, most practical, easiest applied (and most powerful for weight), 4 cycle Gasoline Motor Propeller in existence. Can be attached and detached to any boat in a moment, and can be raised or lowered to run in shallow water when necessary. When in operation the engine is entirely submerged, the water in which it operates forming the cooling jacket, which is a most effectual one. It is fully 1¼ H. P. and will propel a 16-foot boat at a speed of about 7 miles per hour. Can be operated easily by any boy or girl and run for 1 day with 1 gallon of gasoline, but the tank on engine holds only enough for a little over a half day's run.

Write for Catalogue "L" for full description and price.

SUBMERGED ELECTRIC MOTOR CO.

L. W. PIETSCH, Gen. Mgr.

MENOMONIE, WIS.

Chicago Office, 1229 Michigan Ave.

WHY NOT STOP YOUR TROUBLES?

A "Wizard" Tubular
Does It

Armature incased in
WATER-PROOF non-
corroding brass tube.

All brass screws.

Friction Belt or
Governor drive.

Brush holders removed
without loosening
screws.

All parts polished brass.

Contact and
Jump spark.

A trial will convince you.

Most popular and satisfactory Magneto on the market. Prices as
popular as machine
Governor does away with Batteries and Switches.

Hercules Electric & Mfg. Co., Indianapolis, Ind.

30 DAYS' FREE TRIAL.

724 Langsdale Ave.



ELECTRIC BOOK FREE

Shows all the Newest High Grade Electrical Supplies
and Novelties at Lowest Prices in the world. Full of
Holiday Suggestions. A.C., Dewey Electrical Co., Milwaukee

DYKEMA

CONCRETE \$128

MIXER Measures and mixes 2
to 3 yards per hour by
hand—3 to 6 yds. with
engine. Price with engine \$260.
Brick Machines \$35 up. Stone Ma-
chines, Sewer Pipe, Molds, etc. Cat-
alog Free.

DYKEMA CO.

501-7 Huron St.

Grand Rapids, Mich.



BOYS, OUR ELECTRICAL CATALOGUE is free
and contains the best electrical goods at the lowest prices.
Join our free correspondence school and learn how to wire
your house for lights.

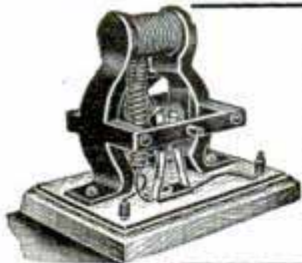
The Wizard Co., Dept. C, 185 Dearborn St., Chicago

THE
White Eagle Electric Motor
Postpaid, 75c

We make working models of inven-
tions. Send for illustrated cata-
logue of Model Supplies.

The Pierce Model Works

134 Pierce Avenue Chicago, Ill.

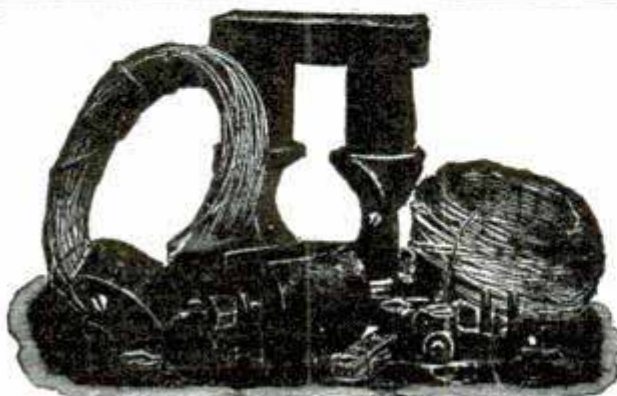


Electric

SUPPLIES, TELEPHONES
NOVELTIES. Catalog of 200
Free. If it's Electric, we have
it. Big Catalogue 4 cts.

OHIO ELECTRIC WORKS, CLEVELAND, OHIO.

The World's Headquarters for Dynamos, Motors, Fans, Toys, Batteries,
Belts, Bells, Lamps, Books. WE UNDERSELL ALL. WANT AGENTS



BUILD YOUR OWN DYNAMO. We furnish complete
sets of castings. Also Electric Railways, Trolley Cars,
Track and Switches. Send for Catalogue "B."

THE GARLISLE & FINCH CO., 262 E. Clifton Avenue, CINCINNATI, OHIO

A RAILROAD OF YOUR OWN

is possible if you buy
Electrical Outfits
from us. Send 2-cent
stamp for 80-page catalogue
—a wonderful book of elec-
tro-mechanical knowledge,
illustrating hundreds of
Electrical Toys and
utilities. If you want the
best Motor made for boys
of every size and age, send \$1.75
for our **Model B's Jim
Dandy Practical Motor**,
sent post-paid. Send 2-cent
stamp for catalogue to

VOLTAMP ELECTRIC MFG. CO.
Voltamp Building,
Baltimore, Md.

DANGLES BY CORD 1,500 FT. IN AIR.—Dangling in
mid-air, 1,500 ft. above the earth, with nothing between
him and death but a thin rope around his waist, and with
his right arm sprained and helpless, Aeronaut Leroyez,
in a recent balloon ascent at Chutes Park, Los Angeles,
Cal., held thousands of people in fear of his destruction.

Leroyez cut loose his balloon and, shooting rapidly
upward, struck a current of air so strong that the bag
gave a severe lurch, jerking the aeronaut from his hold on
the parachute rod. The safety rope attached to the frame
of the parachute and bound to his waist stopped his flight
10 ft. below the rung, but the sudden jerk sprained his
arm, making it impossible for him to climb back to his
perch. There he dangled for 20 minutes until enough of
the heated air escaped to allow the balloon to descend.
From the ground he looked to be hanging unsupported in
space.

Moike—"Who will we send to break the sad news to
the poor widow?"

Pat—"Shure, we'd better send Clancy to break it grad-
ual, because he stammers."

NOT HIRED TO DO THAT.—"I wasn't hired to do
that," we heard a young chap who had been working a
week at his first job tell his father, and here's the lesson
that boy got:

"My son, if you say that aloud or act it, you will proba-
bly be fired before the end of another week. If you only
think it, you may hang on awhile longer, but the thought
will get into your system and poison you for life. It will
stunt your growth and condemn you forever to a dead level
of mediocrity. If you never do anything else but what
you are hired to do, you will never be hired to do much.
That thought will make you the slave of a high stool, a
cotton jacket with an ink-stained left sleeve and a green
eyeshade. That old saying about doing one thing well
is well enough as far as it goes, but, mind you, if you get
so that you can do the thing with your eyes shut it is the
highest time you were doing something else. The only
way to keep yourself out of a rut is to do something well
outside of your regular routine, and, tell me, how can
you manage that unless you do something you are not
hired to do?"

"Now, go back Monday, do what you are hired to do,
and ask for more; or, better, if you can find something
without bothering anybody with questions you are in a
fair way to draw a trump."—Selling Electricity.

Automobile Rechargeable Dry Cell Battery

Battery the Strongest and Longest
Life Fat Spark Generator made,
can be easily and quickly re-
charged many times . . .

PRICE 75 CENTS EACH

The Railway Safety Service Co.

2d Floor Front, Besse Building

SPRINGFIELD, - MASS.



WHY YOU SHOULD SAVE YOUR BURNT OUT FUSES

When we Refill a Burnt Out Fuse, we produce a Refilled CLASS A FUSE equivalent to a NEW CLASS A FUSE at 30 to 100 per cent less the cost of a Class A Fuse



Is 30 to 100 Per Cent Worth Saving?

SNOW'S Refilled Fuses are renewed with the utmost care and subjected to the same rigid tests as are Class A new fuses, to which they are equal in all respects, including appearance. Write us for Particulars and Prices

SEND FOR CATALOGUE No. 7, JUST OUT.

E. W. SNOW & CO., 187 West Avenue, Rochester, New York

ELECTRICIAN AND MECHANIC

A finely illustrated monthly magazine publishing practical educational articles on all branches of electricity and mechanics. Complete directions and working drawings for making steam and gasoline engines, dynamos and motors, furniture, wiring instruction, wireless telegraphy, mechanical drawing, etc. Three months' trial, twenty cents. \$1.00 a year. Catalogue of electrical and mechanical books free. P. M. Sampson Publishing Co., 6 Beacon St., Boston, Mass.



98¢ FAN MOTOR COMPLETE

This electric fan is substantial and practical in all details and nicely finished, fan is removable so motor may be used separately. We furnish extra grooved pulley with each. We are Cut Price headquarters for everything electrical. Send for large free catalog. Dealers wanted everywhere.

THE VIM 68 LAKE ST. DEPT. E 19 CHICAGO

Eldredge Battery Volt-Meter

Reading 0 to 3 Volts in $\frac{1}{10}$ Divisions

A convenient and practical instrument for those who use Primary and Storage Batteries. Its range will cover two cells of primary or one cell of storage battery; is DEAD BEAT in its readings. Non-removable nuts on strong contact posts. Price \$4.



ELDRIDGE ELECTRIC MFG. CO., Springfield, Mass.

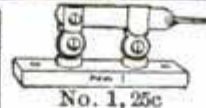
Look Here, Electrical Students and Wireless Enthusiasts!!

Several hundred INDUCTION COILS, taken in trade, giving $\frac{1}{4}$ to $1\frac{1}{2}$ -inch sparks. In good condition and suitable for Amateurs desiring something low-priced. Those not sold January 1st will be broken up as junk. Get Busy, if several dollars saved means anything!!! NEW ENGLAND COIL WINDING CO., Atlantic, Mass.



"Quick Action" IGNITING DYNAMOS and MAGNETOS

The most Reliable Sparkers on the Market. Take the Place of Batteries



"Quick Action" BATTERY SWITCHES

Discount to Trade



Jump Spark Coils FOR ALL PURPOSES

Single, Double, Triple and Quadruple for Stationary Engines and Automobiles. Guaranteed in every particular. Fine Vibrator.

SEND FOR CATALOGUE D. The Knoblock Heideman Mfg. Co. SOUTH BEND, IND.

Advertisers in our Classified Section get RESULTS.

DYNAMO-MOTOR, \$3.50



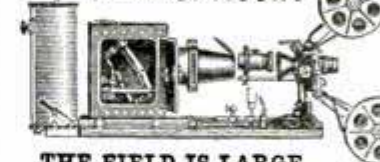
(A Dynamo and Motor in One) As a dynamo, it will light four 6-c. p. lamps easily; operate induction coils; charge storage batteries; decompose water, electroplate, etc. As a motor, will operate sewing machine, jewelers' lathe, emery wheel, circular saw, advertising devices, and other useful appliances.

NEW ADVANCE MOTOR, new design, has two field coils and improved brush holders. Price 70c, postage 2c. Send stamp for catalog, No. 8 of new things electrical.



ARROW ELECTRIC CO., 103 South Canal Street, Chicago, Ill.

MOVING PICTURE MACHINES STEREOPTICONS



comprising the regular theatre and lecture circuit, also local fields in Churches, Public Schools, Lodges and General Public Gatherings. Our Entertainment Supply Catalogue and special offer fully explains everything. Sent Free. CHICAGO PROJECTING CO., 225 Dearborn Street, Dept. 4 Chicago.

You Can Make BIG MONEY Entertaining the Public.

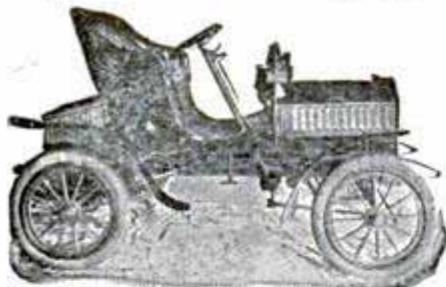
Nothing affords better opportunities for men with small capital. We start you, furnishing complete outfits and explicit instructions at a surprisingly low cost.



THE TURNER BRASS WORKS SYCAMORE, ILL. CHICAGO, ILL.

Manufacturers of Marine Hardware and Motor Boat Specialties. Sole Manufacturers and Licensees of Harroun Auto Bumpers, Martin Alarm and Reserve Valves, Martin Gasoline Separator and Strainer. Write for Catalogue No. 28, Dept. I.





AUTOMOBILES \$100 AND UP

We will mail our large Illustrated Bargain Sheet of new and slightly used Automobiles on receipt of your name and address. This sheet shows accurate photographic views of more than 50 Automobiles offered as low as \$100. Write plainly to

H. GRAHAM AUTOMOBILE CO.

Established 14 years.

601-603-605 Madison Street, CHICAGO, ILL.



DR. DYKE'S PAINLESS PRICES

On Automobile Supplies. Catalog Free.

Read Dr. Dyke's Books: "Diseases of a Gasoline Auto and How to Cure Them," 225 pages, \$1.00. "Anatomy of the Auto," 700 pages, \$1.50. Both books, \$2.00.

PHOENIX AUTO SUPPLY CO.
3932 Olive Street, St. Louis, Mo.

A L. Dyke, Mgr. (Originator first Auto Supply Co. in America.)



NEW MODEL MOTOR

This is the finest motor ever put on the market at a low price. It has a three pole armature which makes it start without assistance when the current is applied. Field is made of soft iron.

Price - - 75 Cents

Send for free Catalog on Everything Electrical and Automobile Specialties.

Geen Electrical Mfg. Co.
180 E. Lake St. Chicago

\$40 MOTOR CYCLE

We have the largest line of New and Used Motor Cycles, Parts and Supplies in the country, at the lowest prices. Every machine guaranteed. We are the largest and only exclusive Motor Cycle house in the world. Send for our 1907 Catalog. Repairs a Specialty.

HARRY R. GEER CO.,
St. Louis, Mo.



A MOTOR-CYCLE OR LAUNCH

at SMALL COST by using one of our Attachable Outfits. A complete line of Finished Motors and Rough Castings for Bicycle, Auto-Marine or Stationary. Send stamp for catalogue.

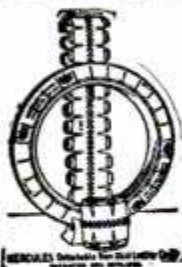
STEFFEY MFG. CO.
Girard Ave. & 30th St., Philadelphia



MAKE A MOTORCYCLE OF YOUR BIKE

at small cost by using our Attachable Outfit. It fits any bicycle. Send stamp for catalog. Send 15 cents for "The Motorcycle Manual." It treats of the motorcycle; how to get more power, etc.

SHAW MFG. CO., Dent B. Gatesburg, Kan.



"Hercules Detachable Cover"

The most wonderful invention in the Automobile Tire Industry. Agents wanted everywhere. This is a big seller. Territory being rapidly taken. Write today for booklet and prices. Special inducements to dealers and supply houses.

THE REPUBLIC RUBBER TIRE & SHOE CO.
449-451 West 53d Street, N. Y. City

THE SEALED BONNET MAXWELL CAR which has just accomplished the great run of 5000 miles without a single adjustment was equipped with a

The Coil of unequalled Reliability and Economy

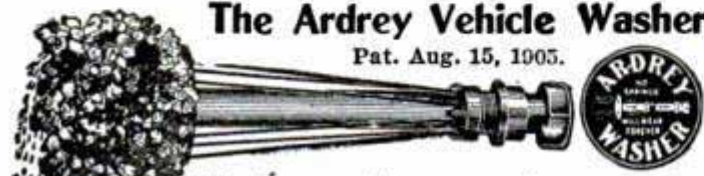
SPLITDORF COIL

Ask Dept. M, for Catalog

C. F. SPLITDORF
261-5 Walton Ave., New York

The Ardrey Vehicle Washer

Pat. Aug. 15, 1905.



Washes carriage or auto perfectly. Fits any hose—Won't scratch varnish—No splashing—Dry hands—Dry clothes. Solid brass—\$3.00 Prepaid. Booklet free.

ARDREY VEHICLE WASHER CO.
140 East Main Street
ROCHESTER, N. Y.

Write to-day.



Catalog free with full information.

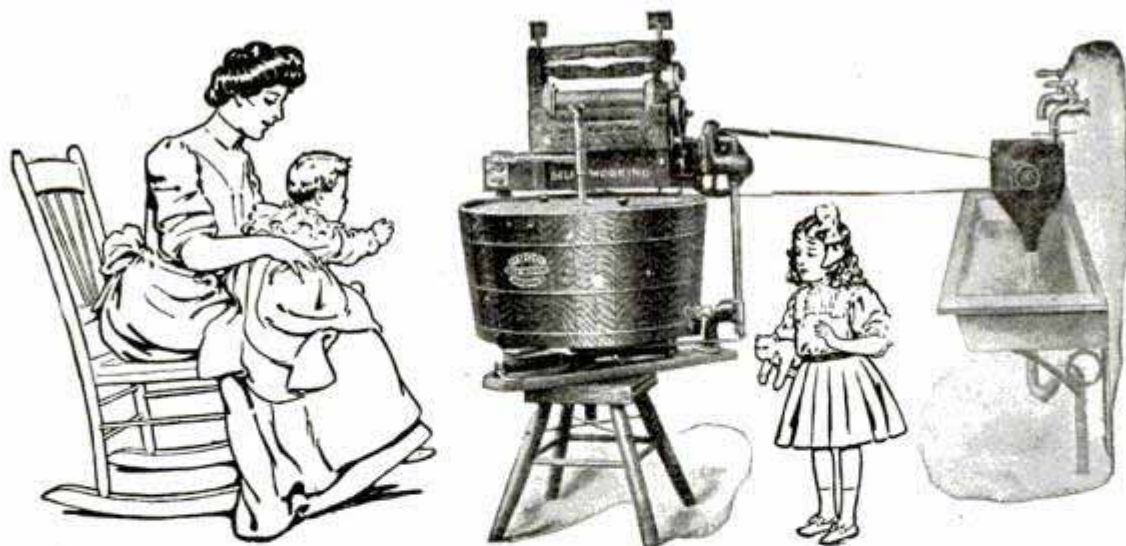
Motsinger Auto-Sparker

Starts and runs

GAS ENGINES WITHOUT BATTERIES

No other machine can do it successfully for lack of original patents owned by us. No twist motion in our drive. No belt or switch necessary. No batteries whatever, for make and break or jump-spark. Water and dust-proof. Fully guaranteed.

MOTSINGER DEVICE MFG. CO.
128 Main St., Pendleton, Ind., U. S. A.



The "Self-Working" Washer Does ALL the WASHING

A twist of your fingers—
That's all it takes to start the "Self-Working" 1900 Motor Washer.

Turn on the water—or electricity—and, in six minutes, your tubful of clothes is clean.

The Washer does all the work—works by itself—while you attend to other duties.

Then—when the clothes are washed, another twist of your fingers switches power to the wringer to wring out the clothes.

50 pounds water pressure or a common electric light current—furnishes power, and 2 to 4 cents a week pays for all you need.

Could washing be made easier?

Another thing—your clothes are safe from wear in a "Self-Working" Washer.

For there is nothing about this Washer to pull, or haul, or beat, or pound the garments.

No complicated inside parts.

Nothing to rub and wear, or fray the fabrics.

Buttons are never cracked—nor torn off.

Seams are never ripped. "Wash tears" are unknown.

You can wash the finest linen, lawn and lace and not break a thread.

For—in the "Self-Working" Washer, the clothes are held still while the water and soap are forced through and over, and under, and around them by the motion of the tub.

Your clothes are washed quickly—thoroughly—safely. And the 1900 Motor Washer saves its own cost many times

over by keeping your linen, your undergarments and other washables from wash-day wear.

Servants are contented where there is a "Self-Working" 1900 Motor Washer.

They don't have to worry about "Wash-Day."

They don't leave and get other places.

Then the 1900 Motor Washer SAVES ITS OWN COST AND PAYS FOR ITSELF.

Don't believe this!

PROVE IT—AT OUR EXPENSE!

You can test a 1900 Motor Washer a full month without paying us a penny.

We will send one of these washers to any responsible party and prepay the freight.

All you do is—agree to test the washer.

Use it a month. Do four weeks' washings.

And—if the washer isn't all we claim, don't keep it. Pay nothing. THE TEST IS FREE.

If you keep the washer—as you surely will wish to, when you see all that it will do and all it will save—you can LET THE WASHER PAY FOR ITSELF.

Write today for our New Illustrated Washer Book, which shows just how this "Self-Working" 1900 Motor Washer works, and tells how it is made—how it Pays for Itself—and all about it.

A post-card with your name and address sent to us today brings you the book by return mail, postpaid.

Address—The 1900 Washer Company, 3108 Henry Street, Binghamton, N. Y.

Or—if you live in Canada, write to the Canadian 1900 Washer Co., 355 Yonge Street, Toronto, Ontario.

COMMERCIAL WIRELESS TRANSATLANTIC SERVICE.—Now comes the announcement from Marconi that all obstacles have been surmounted and that at almost the moment this article appears a commercial wireless service to Europe will be in successful operation. Storms will have no effect and lightning can do no harm, providing the masts and poles used remain undamaged, is the cheerful intelligence sent out from Marconi's camp at Glace Bay, Nova Scotia.

According to Marconi's plan, 10 cents a word for commercial messages and 5 cents a word for press dispatches will be the charge. Later this rate will be cut in two.

The average speed of the service is to be 20 words a minute. For the present the continental Morse code will be used, but if experiments show that the ordinary Morse code is better it will be adopted.

The American station is at Glace Bay, Nova Scotia. The messages will be received on the other side of the Atlantic at Clifden, Ireland, and the Cornwall station will be utilized as a secondary plant.

"I shall make no show about it, but go along quietly," says Marconi. "All obstacles have been overcome, and we are sure of success."

30 DAYS' TRIAL

of any \$15 to \$100 violin or other stringed instrument before you decide to buy. We pay expressage both ways if the goods are not satisfactory. You do not risk one cent in ordering—30 DAY TRIAL—FOR you decide to buy. We can afford to guarantee satisfaction when selling our highest quality instruments at such remarkably low prices, for we import direct from our workshops at Elsieben, Shilbach and Pedrona, and we know that a trial will convince you of the superiority of our values. Our catalog lists violins from \$5.00 to \$100 and upwards. If you want a violin, viola, cello or other stringed instrument, be sure to get this catalog before you buy. Our catalog explains how violins are made, how you can tell a good violin by its wood, construction and varnish. This catalog also gives other valuable information for purchasers of violins. You OUGHT to have this catalog. Do not buy a stringed instrument of any kind until you have seen the Lewis catalog and studied it thoroughly.

Write today for our catalog No. 14.

WM. M. LEWIS & SON, Makers and Importers

Est. 1869. 220 Wabash Ave., Chicago.



SCROLL SAWS

I will send this beautiful design with 300 miniatures and my illustrated catalog of Scroll Saws, Lathes, Fancy Words, Metal Trimmings and Tools, postpaid on receipt of 15c, or send 6c for catalog only. Address

The POMEROY
Scroll Saw Co.

440 Asylum St., Hartford, Conn.

Div. 2

SCROLL SAWS
FROM 50c TO \$22.50

EVERY INVENTOR

Who Wants to know

1. What are the most profitable inventions,
2. How to perfect inventions,
3. The first step to take in getting a patent
4. How to protect himself from parties who might steal his invention before he can get a patent
5. How to find out what patents have been granted on inventions like his, or intended for the same purpose.
6. How much it costs to get a patent,
7. How long it takes to get a patent,
8. What protection a patent is,
9. How he can sell his patent after he obtains it
10. How to handle his patent to get the most money out of it,
11. Where and at what expense he can have working drawings made of his invention,
12. Where and at what expense he can have models or experimental machines made,

should send his questions to

POPULAR MECHANICS PATENT
BUREAU,

Journal Bldg. - - Chicago, Ill.

Patent What You Invent.



Your ideas may bring you a fortune if properly introduced.

Our three books mailed free.

"U. S. LETTERS PATENT" gives full information in patent matters.

"THOUGHTS THAT PAY" gives list of what to invent.

"THOUGHTS THAT HAVE PAID" gives history of successful inventions.

Write for them.

\$1,000,000 offered for one invention! No charge for report as to patentability; send sketch or model.

Patent obtained or fee returned. Patents advertised for sale, free.

WOODWARD & CHANDLEE
PATENT ATTORNEYS
1255 F Street, WASHINGTON, D. C.

SUGGESTIONS FOR INVENTORS.—The mechanical stoker has occupied the attention of locomotive men for several years now, with seemingly very little result. May not this arise from working along wrong lines? The aim of all of the mechanical stokers thus far developed for locomotive use is to in some measure duplicate the action of a man in firing. In stationary work the stoker is a success, and this success has been achieved by abandoning any attempt at duplicating the human effort and working along lines now well known. It would seem as if the results of stationary practice should point out the lines along which the object could be achieved in locomotive practice, viz.: an attempt at some application of the roller grate principle. The heating of the feed water on locomotives is, like the abolition of the smoke box deflector plate, an apparently simple problem which has not yet, however, been satisfactorily solved in this country. Many arrangements for the purpose have been tried, only to be abandoned after more or less short trial. Yet the possibilities are most attractive and increasingly so as the subject is more fully gone into. The recent English plan of abandoning the injector in favor of an ordinary stationary boiler feed pump would seem to obviate one phase of the difficulties experienced in some plans. Even retaining the injector, however, some adaptation of the closed type of heater, utilizing the air pump exhaust, would seem to be possible. Certainly anything in this line accomplished outside the boiler proper would result in considerable advantage to the interior thereof.—Railway Review.

THE WASTE OF THE WORLD MATERIALIZED.—One of the greatest, and yet in some instances the easiest, problem of the world today is how to materialize the world's stupendous waste.

In too many instances "the round man gets the square hole." The saddest plaint in the world is "What I might have been." A system of education must be found to remedy this evil by eliminating wasted human effort.

In time the currents of air that idly wander by, or harvest ruin and destruction in the form of cyclone or tornado, will be broken to harness; the everlasting heat of the sun made to warm the houses of men, and the mighty but now useless force of the tides harnessed to the wheels of commerce.

In time the resident forces of electricity, now lying dormant, will lift the burden of heart-breaking toil from the shoulders of men, women and children. The farmer must learn to eliminate the waste and cultivate fewer acres.

The powers of nature overflow in wealth almost unheeded. Their surplus energy foretells what the future will surely bring—a better and cleaner living, the acme of the world's supremacy.

CAR FALLS WHEN ENGINEER FAINTS.—While lowering a car into the shaft of an iron mine at Upper Hibernia, N. J., the engineer, after opening the throttle of his engine in the shaft-house, fainted. The car dropped 400 ft. to the bottom of the shaft at full speed, killing two and seriously injuring six Hungarian miners who were being lowered to their work. Over an hour elapsed before the injured men could be brought out.

INVENTORS

OUR BRAIN BELONGS TO YOU

We have helped a great many over mechanical difficulties. Our Ideas Are Free of Charge. All we want in return is to build your Model, Special Machinery or Tools to manufacture sheet-metal goods or novelties of any kind. We are expert mechanics and our experience covers over thirty years. Consultation free, also our Booklet No. 16.

A. NACKE & SON, 240 S. 9th Street, Philadelphia, Pa.

PATENTS SECURED PROMPTLY and with special regard to the Legal Protection of the Invention.

HAND BOOK FOR INVENTORS AND MANUFACTURERS SENT FREE UPON REQUEST.

Consultation Free. No charge for opinion as to the patentability and Commercial Value of Inventors' Ideas.

HIGHEST REFERENCES FROM PROMINENT MANUFACTURERS

C. L. PARKER, PATENT LAWYER

Patents, Caveats, Trade Marks, Copyrights, Validity Reports, Interference Contests
Patent Suits Conducted in All States

REFERENCES:—Globe Machine and Stamping Co., Murray Engineering Co., Morgan Machine and Engineering Co., Berkshire Specialty Co., Stewart Window Shade Co., Macon Shear Co., Acme Canopy Co., Lippencott Pencil Co., Salisbury Tire Association of America, Oakes Manufacturing Co., By-Products Co., Alabama Brewing Co., National Offset Co., Antiseptic Supply Co., Richmond Electric Co., Railway Surface Contact Supplies Co., National Electric Works.

Mr. Parker on November 1, 1903, after having been a member of the Examining Corps of the U. S. Patent Office for over five years, resigned his position as Examiner to take up the practice of Patent Law.

Address 210 Dietz Building

WASHINGTON, D. C.

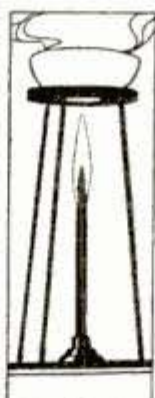
Publisher's Notice to Subscribers in Canada

The Post Office Department of Canada has abrogated the treaty in force with the United States for many years by which periodicals have been mailed from this country to Canada at 1 cent per pound. The rate is now made as high as to the most distant point in the world and forces Popular Mechanics to raise its subscription price to all Canadian subscribers to \$1.50 per year.

The retail price on newstands will remain at 10 cents per copy as the newsdealers' supplies are shipped in bulk by freight.

POPULAR MECHANICS

The Miner-Lawrie Laboratories



Chemical Analysis and
Consultation

Expert Aid to Manufac-
turers

Factory Problems

Patent Processes and
Litigation

Consulting Chemists to
Popular Mechanics

355 Dearborn Street
Chicago Illinois

CARL S. MINER
JAMES LAWRIE, Ph. D.

Telephone Harrison 3332

PATENTS

Careful attention given to the prosecution of business before the patent office. Patents procured and **no attorney fee called for until patent is allowed.** (23 years experience.) Write for "Inventor's Guide." Address

Franklin H. Hough

Washington Loan & Trust Bldg., Washington, D. C.

"MR. INVENTOR"

Our Business is to Perfect, Develop and Manufacture your invention. All modern facilities are ours, and we are at your service. We employ Expert Mechanics on **Specialties, Dies, Punch Work and Models**. Send us your drawing or model and we will submit our lowest price.

MONARCH TOOL COMPANY, 124 Opera Place, Cincinnati, Ohio

LET US BE YOUR FACTORY

We make anything to order—Stampings, Sheet Metal work—anything a good machine-shop should do—we do—because we're good ones. We publish "The Silent Partner." Ask for a sample copy. Write us.

THE GLOBE MACHINE & STAMPING CO.
3610 Hamilton Avenue, N. E. Cleveland, Ohio

Sterling Novelty Mfg. Co.

SPRINGFIELD, OHIO Established 1890

Manufacturers of Metal Novelties and Specialties to order. We have facilities for making Metal Novelties and Specialties in large quantities on short notice and at reasonable figures. We solicit your order and guarantee satisfaction.

PATENTS GUARANTEED. PATENTS SECURED OR FEE RETURNED.

Send model or sketch for free report as to Patentability. Send for finest publications ever issued for free distribution "HOW TO OBTAIN A PATENT," with 100 MECHANICAL MOVEMENTS illustrated and described, and "WHAT TO INVENT," containing valuable LIST OF INVENTIONS WANTED.

ONE MILLION DOLLARS offered for one invention, \$16,000 for other. Patents advertised free in "WORLD'S PROGRESS." Copy free.

EVANS, WILKENS & CO., 615 F Street, WASHINGTON, D. C.

PATENTS PROTECT YOUR IDEAS

Send for INVENTOR'S PRIMER.
NO PATENT, NO FEE.

Patent Advertised FREE.

MILO B. STEVENS & CO., Established 1864.

885 Fourteenth St., WASHINGTON, D. C.
Branches at Chicago, Cleveland, Detroit.

WE CAN SELL YOUR PATENT

We can form, finance, and promote corporations. Send \$0.25 for terms and three months' subscription to LAMSON'S INVESTOR, 153 Milk St., BOSTON, MASS.

PATENTS THAT PROTECT AND PAY

WATSON E. COLEMAN

Registered Patent Attorney

626 F Street, N. W. WASHINGTON, D. C.

Advice and Book Free; Highest References; Best Services.

PATENTS and TRADE MARKS obtained defended and prosecuted by Alexander & Dowell, Patent Lawyers. (Established 1857.) "F," 607 7th St., N. W., WASHINGTON, D. C. Book of Information sent FREE.

I SELL PATENTS

The Oldest Exclusive Patent Sales Business in America

CHARLES A. SCOTT

1096 Granite Bldg., Rochester, N. Y.

**MODELS and GEARS INVENTIONS PERFECTED**

CATALOGS FREE

UNION MODEL WORKS, 191 South Clark St., Chicago, Ill.

PATENTS

Valuable Book on Patents FREE. Tells how to secure them at low cost. How to sell a Patent and What to Invent for Profit. Gives Mechanical Movements invaluable to Inventors. Full of Money-Making Patent Information. NEW BOOK FREE to all who write.

O'MEARA & BROCK, Patent Attys.,

918 F. STREET. WASHINGTON, D. C.

PATENTS that PROTECT

Our 3 books for inventors mailed on receipt of 6 cts. stamps
R. S. & A. B. LACEY, Washington, D. C. Estab. 1869.

We give you PROOF of the money value of the patents we procure.—L. & L.

HOW A STOVE TRANSFORMED THE FARM.—Judging from the following remarks, which have been going the rounds, the strenuous life has got the rural population in its grip:

"About five years ago the old cook stove got so unpopular with women folk that we simply had to buy one of those big steel ranges that set us back \$60. When this great bakery was installed it made some other things in the kitchen look like three dimes. A lot of modern steel and tinware had to come soon afterward—the old things wouldn't work on that new range. Then a neighbor just the other day telephoned a testimonial about an oil stove—just the thing for the kitchen in summer time—so we have got to buy one.

"When the women got the kitchen work lessened they had more time for other parts of the house. Of course, one of the daughters in the family had taken some music lessons. She butted in and urged the purchase of a piano. That piano of ours drew a new center table into the parlor, then a new-fangled lamp, and Lord knows how the endless chain is going to drag out.

"Two years ago these busybodies, these women, took up the bathroom proposition. Now we have a bathroom with a big porcelain tub in it; but before we got that outfit we had other rivers to cross. We had to drill a well, put in a windmill, construct a tower, and build a reservoir. Then there was a lot of piping and plumbing to do. And while we were at it we put in a lighting plant—acetylene gas. The windmill got lazy on still days, on which there seemed more than wind enough, so we had to buy an engine to do its work.

"Then there was more trouble. This engine was hard to keep in business—it cleaned up all the work we could find for it, so we had to get busy and devise new chores for it. Why not buy a cream separator to run with the engine? Why not buy a feed grinder to work it? Yes, get a fanning mill, a new meat chopper, a sheep shearing machine and a few other tools to work this devilish gasoline engine.

"Now, efficient farm labor is getting scarce, and we are trying to reduce our requirements for it, so we purchased some two-row cultivators. Wanting to get the most out of our corn crop, we have built a silo; that will call for a silage cutter, also a corn binder. As hay is a short crop, we are going to bale a lot of oat and wheat straw—this will compel us to buy a baling press. New ideas as to corn culture have caused us to invest in surface cultivators and one-horse harrows to use at the last cultivation.

"Of course, we must keep peace in the family; or, in other words, the women folk demand an appropriation for their department every year, and it is increasing right along. But the best of it is that the more things we buy the more money we can make, and the better we can live; so I guess we are coming out all right, after all. Our women folk get to town more than ever before, read more, and plan more. The men also get out and mix with one another and with business men. This broadens us and makes us want some of the things city people heretofore have had as their exclusive possessions. We are using printed stationery, operate a typewriter, and have a copy press."

NEW INVENTIONS

DESIGNED, PERFECTED, SIMPLIFIED AND IMPROVED

We make them Meritorious and Patentable, put Commercial Value into them and find parties to Manufacture or Finance.

Success can be had only by perfecting and making your invention RIGHT before applying for the patent. Examinations and Reports made on all classes of Mechanical and Industrial Properties, New Inventions, etc. Estimates on Drawings, Experimental and Test Work. Address ENGINEERING DEPARTMENT,

INDUSTRIAL NEWS BUREAU, Ithaca, N. Y.



CUTS
WE MAKE THEM CLEAN, BRIGHT,
& SHOWY, TO ILLUSTRATE CATALOGS
& ADVERTISEMENTS. SEND FOR SAMPLES
JACME ENGRAVING CO.
155 WASHINGTON ST. CHICAGO.

FREE
TWO BOOKS:
68-Page
"Inventor's Guide"
AND
"Fortunes in Patents"
"What and How to Invent"

PATENTS

Protect Your Idea!

SPECIAL OFFER: Send sketches or model and description of invention for FREE SEARCH of Patent Office Records and Report as to patentability. You will save TIME and MONEY.

E. E. VROOMAN, Registered Patent Attorney
Box 71, Washington, D. C.

REFERENCES:
American National Bank,
Washington, D. C.
Popular Mechanics,
Chicago, Ill.
Little Giant Hay Press Co.,
Dallas, Texas.
Gray Lithograph Co.,
New York City, N. Y.

INVENT ing? "HOW AND WHAT TO INVENT"
and "HOW TO OBTAIN PATENTS"
explained FREE. CHESTER W.
BROWN, Patent Attorney, 996 F Street, Washington, D. C.

A SNAP FOR INVENTORS

All your money back if patent is not allowed. For full particulars address SILAS C. SWEET, Patent Attorney, 724 I. L. & T. Bldg., Des Moines, Iowa.



TYPEWRITERS AT SAVING OF 50%

All makes—good as new, biggest bargains ever offered. Shipped on approval for trial. We rent all makes at \$3.00 per month and allow rent on price. Send for Catalog, Special Flyer and Terms.

ROCKWELL-BARNES CO., 1035 Baldwin Bldg., Chicago, Ill.



TYPEWRITER BARGAINS

All Standard Makes, \$15 to \$65. Most of these machines have been only slightly used—are good as new. Shipped on approval. Don't buy a Typewriter before writing us. We will give you the best typewriter bargains that can be offered. Address

McLaughlin Typewriter Exchange
207 N. 9th St. St. Louis, Mo.

Agents Wanted

\$100 weekly can positively be made selling and appointing agents to sell our Hydro-Carbon Lighting Systems and Lamps. Our Success Demonstrating System makes failure impossible. We offer a grand opportunity to make money. Wanted a good man in every town, village and city in the world
Light Dept.,

National Stamping & Electric Works
151-159 Jefferson St., Chicago, U. S. A.

INSTANTANEOUS WATER HEATERS.

Just light the gas, hot water instantly pours forth, 3 gallons a minute, continuous flow. No boiler or tank required. 1000 gallons hot water for 85c worth of gas. Greatest heater ever made.

AUTOMATIC WATER HEATERS

The kind that get busy when you "turn the faucet."

IRA J. O'MALLEY, 89 E. Lake St., Chicago
Retailer Mechanical Supplies, pipe, fittings, burners, plumbing sundries, pipe repair clamps, etc., etc.

LIGHT YOUR STORE

your home, factory or business place better than your neighbors and save 50% to 75% by using our

Brilliant Gas Lamps at \$5.00 each
or our CLIMAX LIGHTING SYSTEMS

The best lighted stores use them and there are more in use than all other kinds put together. If you want the brightest store in town or the best reading lamp, send us your order at once or write for our P. O. P. Catalogue.

BRILLIANT GAS LAMP CO.
42 State St., Chicago, Ill.

Exclusive manufacturers of above goods.



PATENT YOUR IDEAS



Cash offers for certain inventions. Book "How to Obtain a Patent" and "What to Invent" sent free. Send rough sketch for free report as to patentability. We advertise your patent for sale at our expense.

Patent Obtained or Fee Returned.
CHANDLEE & CHANDLEE, Patent Att'ys,
(Established 1876)
945 F. Street, Washington, D. C.

SPECIAL MACHINERY

We design and build special machinery to order in any quantity desired. Cut gearing.

CRARY MACHINE WORKS

35-41 Indiana Street, Chicago



TYPEWRITERS ALL MAKES

All the Standard Machines SOLD or RENTED ANYWHERE at 1/2 to 3/4 MFR'S PRICES, allowing RENTAL TO APPLY ON PRICE. Shipped with privilege of examination. Write for Illustrated Catalog
TYPEWRITER EMPORIUM 230 FIFTH AVE. CHICAGO

\$1.00 THE "READY" is the only instrument made with which you can take measurements and draw sketch of any mechanical layout.

Graduated in 10ths, 20ths, or Metric Units. It's a practical tool in every way. You can carry it in your vest pocket. Send us your name and we will tell you more, or send Money Order today. You need the Ready.

READY MANUFACTURING COMPANY
Dept. B. Rochester, N. Y.

ACCURACY Not guess work with a patented LEMON MEASURING-CALIPER

Meets the requirements of and exceeds the limits of all other calipers. The only instrument for reaching over and measuring inside of reinforced edges or heavy rims. Sold Direct—Ask for Description and Price.

THE WEST MFG. CO., Columbus, O.
(Note—If you have a Patented Article to manufacture, write us.)

The "NULITE" VAPOR LAMPS

For Home, Store and Street

We also manufacture Table Lamps, Wall Lamps, Chandeliers, Street Lamps, Etc. 100 Candle Power seven hours ONE CENT. No Wicks. No Smoke. No Odor. Absolutely safe. THEY SELL AT SIGHT.

CHICAGO SOLAR LIGHT CO., 6 River St., CHICAGO

Exclusive territory to good agents.

Write for catalogue and prices.

Plumbing Supplies

AT WHOLESALE

If you need anything in my line, and wish to

Save Money

on every article, write for my free illustrated Catalog. Shipments promptly made from a very complete stock of new latest pattern goods. Small orders are as carefully handled as large ones.

B. P. KAROL, 235 W. Harrison St., Chicago, Ill.

Learn To Be QUICK at FIGURES

HOW TO GET A BIGGER SALARY

Do you want to earn a bigger salary? Do you want to be worth more to yourself and to your employer? If you want to hold the whip-hand in commercial transactions, write for our free book, "Rapid Calculation."

It tells all about a system that enables you to handle figures with marvelous ease and rapidity; a system that enables you to handle groups of figures just as easily as you now handle single figures. It shows how you can add, subtract, multiply or divide rows of figures in your head without having to resort to pencil and paper. It cuts the work of almost every transaction in figures in two. It is not necessary for you to have an aptitude for figures to master this method. Anyone of ordinary intelligence can learn in a few evenings at home.

Our Free Book "Rapid Calculation"

tells you all about it. It may improve your whole business life. A study of the system is intensely interesting, and cannot help but be of value to you. Fortunes are lost through mistakes in figuring. This system enables you to prevent mistakes. Big financial deals often go to the man who can figure the quickest. The system that this book explains will teach you rapid calculation in every branch. Every page of this book should be worth a dollar to you, yet its only cost is the effort to ask for it. All you have to do is to send your name and address and the book will be forthcoming by the next mail. Address

Commercial Correspondence Schools, 19 B, Commercial Building, Rochester, N. Y.

Be Successful in Life And Make More Money

Get at once a copy of

THE LAW OF FINANCIAL SUCCESS

BY EDWARD E. BEALS.

A handsomely printed and bound book of 112 pages, filled from cover to cover with definite, practical instructions on How to Succeed in Life and Make Money. An absolutely new departure along this line of thought. Tells how to get what everybody wants—**Financial Independence**. If you are a natural Money Maker, this book will help you to make more and make it faster. You may be using the Law unconsciously; learn how to use it consciously by studying this book. If you are poor, it will show you how to get out of the rut and prosper. Tells you how to Make Money the easiest, simplest and best way. This book is no magic scheme to make you rich overnight, but is a plain, simple statement of truths that all can understand and put into practice by a little thought and study. It combines theory with practical knowledge. Now in its third edition of 100,000 copies and this going fast. Price 10 cts. Get it of your newsdealer, or send direct to us—**NOW** before you forget it.

SEND
10c
TODAY

THE FIDUCIARY PRESS, 1002 Tacoma Bldg., Chicago

WE CAN TEACH YOU TO DRAW

You can earn \$20 to \$50 and upwards per week.

We have successfully taught all branches of drawing by correspondence since 1898. Practical, personal instruction. Experienced teachers. Art Director educated in Europe. Positions guaranteed. Successful students everywhere. Illustrated Year Book free.

SCHOOL OF APPLIED ART,

59-73 Fine Arts Bldg., Battle Creek, Mich., U.S.A.

LEARN SIGN PAINTING

Sign painters make \$5 to \$10 per day. My book of designs and instructions will teach you how to paint both advertising and commercial signs. No long period of instruction. My plan is complete and inexpensive. Price, complete by mail, only ONE DOLLAR. Remit with order, ONE DOLLAR. No correspondence solicited. Money back if you are not pleased. Address



WILLIAMSON SIGN SYSTEM

Delmar Blvd and Clara Ave., St. Louis, Mo.

\$5 A DAY and over is earned by our graduates after 2 to 3 months' Practical Instruction in
PLUMBING, PLASTERING,
BRICKLAYING or ELECTRICAL TRADES
Free catalogue. Positions secured. Dept. P

COYNE TRADE SCHOOLS
New York Chicago San Francisco

BIGGEST BATTLESHIP LAUNCHED.—The Japanese have launched their battleship, "Aki," which outclasses even the huge "Dreadnaught" of the British navy. This gives the Japs credit for having the largest battleship in the world, for the "Aki" is 462 ft. long, 83½ ft. wide, and has a displacement of 19,800 tons. Turbine engines of 25,000 hp. will give her a speed of 21½ sea miles. Her armor belt is 9½ in. thick, and the armament includes four 12-in., twelve 10-in. and eight 6-in. guns.

WRITE THEM A LETTER TO-NIGHT.

Don't go to the theatre, concert or ball,
But stay in your room to-night;
Deny yourself to the friends that call,
And a good long letter write;
Write to the sad old folks at home,
Who sit, when the day is done,
With folded hands and downcast eyes,
And think of their absent son.

Don't selfishly scribble, "Excuse my haste—
I've scarcely the time to write,"
Lest their brooding thoughts go wandering back
To many a bygone night
When they lost their needed sleep and rest,
And every breath was a prayer
That God would leave their delicate babe
To their tender love and care.

Don't let them feel that you've no more need
Of their love or counsel wise;
For the heart grows strongly sensitive
When age has dimmed the eyes.
It might be well to let them believe
You never forget them—quite;
That you deem it a pleasure, when far away,
Long letters home to write.

Don't think that the young and giddy friends,
Who make your pastime gay,
Have half the anxious thought for you
That the old folks have to-day.
The duty of writing do not put off;
Let sleep or pleasure wait,
Lest the letter for which they longed
Be a day or an hour too late.

For the loving, sad old folks at home,
With locks fast turning white,
Are longing to hear from their absent son.
Write them a letter to-night.

—Anon.

A SUBSCRIPTION TO Popular Mechanics

for a whole year costs only \$1.00 and makes a splendid Christmas present for any man or boy, and one that lasts for 12 months. Every month there are over 100 articles and illustrations.

January, 1908, issue out in time
FOR CHRISTMAS

SUCCESSFUL DRAFTSMEN

Draw ^{\$125} **to** ^{\$150} **Monthly**

when taking individual instructions from
Chief Draftsman of large concern,
 who will in few months' home study equip you fully with complete technical and practical knowledge enabling you to *start* at above salary. *Furnish tools free of charge* and steady position when completed. Reasonable terms and success guaranteed. - Best trade with best future.

Address **CHIEF DRAFTSMAN,**
 Div. 19, Eng's Equip't Co. (Inc.) Chicago



Learn Bricklaying

and earn from \$5 to \$8 per day. Ours is the only thoroughly practical school in America. We teach bricklaying exclusively. Large, well lighted work-rooms. Instructors are men of wide experience in bricklaying and contracting. Only two or three months required to master the trade. Positions always open to our graduates. Demand greater than the supply. Day and evening classes. Write today for **free illustrated booklet**
 CHICAGO SCHOOL OF PRACTICAL BRICKLAYING, 2115 W. Adams St. Dept. I, Chicago



THERE IS MONEY IN MONEY!

Some coins you handle are worth two to ten times their face value. Get informed on the value of United States money of different dates. It may be worth dollars to you; 25 cents in coin or stamps brings you book worth 100 times the price if it helps you find a rare coin.

Address XX,
 Care R. F. D. NEWS
 160 Washington St., :: Chicago

LEARN JEWELERS ENGRAVING

"The Engraving School that Graduates Experts"

A fascinating, high-salaried and easily learned trade, taught thoroughly and practically by correspondence. We will teach the beginner better engraving by correspondence than he can gain in years of rigid apprenticeship. We will improve the skill of any engraver one hundred per cent and make him master of the trade. The demand for competent engravers far exceeds the supply. Send for handsome illustrated prospectus.

Page-Davis School } Dept. 112, 90 Wabash Avenue, Chicago.
 } Dept. 112, 150 Nassau Street, New York.

LEARN TO WRITE ADVERTISEMENTS

If you want to earn \$25 to \$100 per week, write for our beautiful prospectus, sent FREE upon request. We will teach you advertising thoroughly by mail.

PAGE-DAVIS SCHOOL,
 90 Wabash Ave. Dept. 1112. Chicago.

HOROLOGICAL DEPARTMENT

BRADLEY POLYTECHNIC INSTITUTE
 Formerly Parsons Horological Institute
 PEORIA, ILLINOIS.



LARGEST and BEST WATCH SCHOOL IN AMERICA

We teach Watch Work, Jewelry, Engraving, Clock Work, Optics. Tuition reasonable. Board and rooms near school at moderate rates.
 Send for Catalog of Information.

We teach Furniture Designing, Rod Making, Stock Billing, Ornamental Drawing, Water Coloring and Interior Decoration by mail.

GRAND RAPIDS SCHOOL OF DESIGNING.
 A. KIRKPATRICK, Instructor.
 544-545 Houseman Bldg. :: Grand Rapids, Mich.



"The key to Success"



I HAVE reduced the art of memory to a science so that the ordinary brain is capable of retaining facts, figures, faces as easily as the more gifted. I TEACH you to stop forgetting by a few simple rules. No wearying or tedious lessons or long hours of practice.

I HAVE taught more than 20,000 people

YOU ARE NO GREATER INTELLECTUALLY THAN YOUR MEMORY

HOW TO REMEMBER

MY METHOD increases business capacity, income, social standing, gives an alert memory for names, faces, business details, studies. Develops will, concentration, personality, self-confidence, conversation, public speaking, writing, etc.

WRITE TO-DAY for free copy of my interesting book, "How to Remember," also trial copyrighted exercise, and see how simple my memory training really is.

DICKSON MEMORY SCHOOL

A705 The Auditorium CHICAGO

Stop forgetting

MY BOOK FREE

"HOW TO REMEMBER"

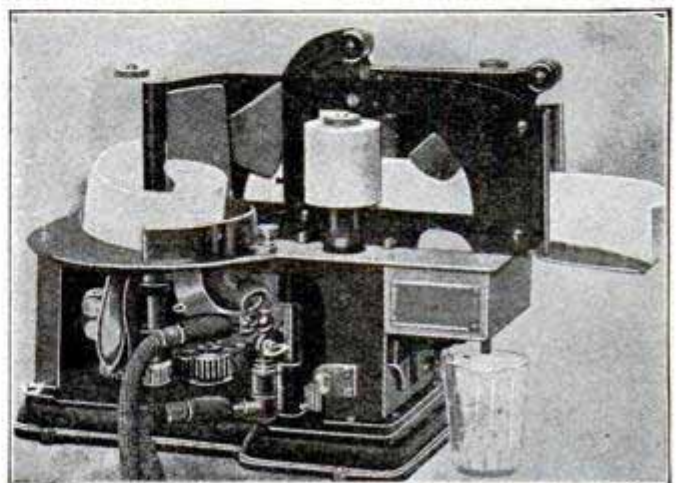
LEARN HOW TO JUDGE INVESTMENTS

My book "How To Judge Investments" tells how you may safely start on the road to wealth. It tells you about everything you should know before making any kind of an investment. A financial critic says of this book, "It is the best guide to successful investing I ever read." The regular price is \$1.00, but to introduce my magazine, the "INVESTOR'S REVIEW," I will send the book postpaid on receipt of a two-cent stamp and in addition will send you the Review for three months free. Address Editor,

INVESTOR'S REVIEW 1461 Gaff B'dg. Chicago, Ill.

MECHANICAL PUZZLE PICTURES.

NO. 3.—This is neither a printing telegraph nor a penny-in-the-slot soda fountain. Thousands of them are used every day, although not one person in a thousand ever saw



one. No prize for correct solution; but answer will be given next month.

ANSWER TO NO. 2.—English electric heater for residences or office.

A GRATEFUL INVENTOR.—The following letter from a Louisville inventor, dated September 11, 1907, explains itself:

"Popular Mechanics Patent Bureau, Chicago, Ill.—Gentlemen: Yours of the 9th inst., enclosing specifications of patents similar to the one I submitted to you, at hand, and it shows me at once the futility of trying to patent my idea.

"I have you to thank for this saving of my patent office fees, as they would have been utterly useless, and I congratulate myself that I had the good luck to secure your services instead of those of the so-called patent attorneys who get up such glaring advertisements, and take all the money a struggling inventor can spare, even when they know that the idea is no good that he is working on.

"If in the future you ever care to refer any prospective clients to me, I will be only too glad to be of service to you, as I can honestly recommend you as able exponents of the 'square deal.' Thanking you again for your services. I remain, yours truly, S. E. Barnwell, Gen'l Del., Louisville, Ky."



I TEACH SIGN PAINTING

SHOW CARD WRITING or LETTERING by mail and guarantee success. Only field not overcrowded. My instruction is unequalled because practical, personal and thorough. Easy terms. Write for large catalogue.

CHAS. J. STRONG, President.

DETROIT SCHOOL OF LETTERING DEPT. PM. DETROIT, MICH.

"Oldest and Largest School of its Kind."

LEARN WATCHMAKING

Refined, profitable labor—Competent men always in demand. We teach it thoroughly in as many months as it formerly took years. Does away with tedious apprenticeship. Money earned while studying. Positions secured. Send for catalogue.

ST. LOUIS WATCHMAKING SCHOOL, ST. LOUIS, MO.

12 Art Panels, 50c

Beautiful Duo Tint Reproductions of Famous Paintings



Studies of the Human Form Divine

Most Exquisite Portrayals of "Woman Beautiful" ever shown in one collection. We send full set of 12, together with 80 life-like miniatures of other beautiful art pictures for only 50c coin, stamps or Money Order. 2 sets different \$1.00.

GORDON ART CO.

Dept. C 24. 1209 Foster Ave., Chicago

Money back if not satisfied.

Free ORDER AT ONCE and we will include an extra picture entitled "Psyche," absolutely free.



BECOME A CARTOONIST

As a competent illustrator, designer or cartoonist you can command \$20 to \$40 a week, or run an independent studio and work when you please. I guarantee to qualify you at your home by mail during spare time, or refund tuition money, but your work must show ability to succeed or I will not teach you.

I will send you my Test Lesson Free and the drawings you return will enable me to tell what your ability is. If I am willing to teach you I will tell you so honestly and frankly, otherwise you pay me nothing. Send me your name and address and I will send you my Test Lesson Free, advise you frankly and honestly whether to follow this business. I can tell when I see your work.

D. ELKED WOOD, President

THE ACME, 5th of Downing, 605 Acme Bldg., Kalamazoo, Mich.

Correspondence or Resident Instruction



THE FINEST PIPE TOBACCO SENT Direct from Factory to Smoker

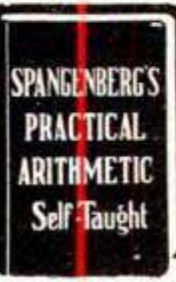
This trial offer is to convince you who tire of ordinary tobacco that after all there is one that delights continuously. That one is

FRENCH'S MIXTURE

It comes to you direct from the maker with all its exquisite original aroma and known purity. This insures you against substitution and driedout, stale store tobacco. French's Mixture won't "tire" or "bite" the tongue, because it's a superior product scientifically handled, blended and always in condition. We also sell it direct to save middlemen's profits. We put those profits into improving quality, making it rightfully

"THE ARISTOCRAT OF SMOKING TOBACCO"
FRENCH TOBACCO CO.
Dept. 38 Statesville, N. C.

Send 10 cents in silver or stamps for a large sample pouch and booklet; both will be a delight to you.



ARITHMETIC

SELF TAUGHT

Plain, easily understood volume for ALL who have not had the opportunity of learning this subject thoroughly, or who have forgotten what they once learned. 257 pages. Requires no teacher. Send 60c. (stamps accepted) for this great book in cloth.

Edition de Luxe, \$1.00
GEO. A. ZELLER BOOK CO.
4478 Belle Place, St. Louis, Mo. Est. 1870



VENTRILOQUISM

LEARNED BY ANY MAN OR BOY AT HOME.

Small cost. Send to-day 2c. stamp for particulars and proof.

O. A. Smith, Room 474, 2540 Knoxville Ave., Peoria, Ill.

WANTED

YOUNG MEN AND BOYS TO LEARN A TRADE

LOOK UP

LOOK AHEAD

LEARN A TRADE AND BE INDEPENDENT

We have more positions at good pay, open for our boys than we can fill. You can in a short time fit yourself to earn more money than in years of apprenticeship.

Don't just happen into the first "job" that offers, and drift through life. Nine boys in ten do that, but you can be the tenth, and have something to say yourself about your future.

Our instructors are all picked men of skill and experience, and our shops are equipped with the latest and finest machines.

YOU CAN MAKE YOURSELF AN EXPERT
Electrical or Mechanical Engineer,
Foundryman, Printer, Lithographer,
Carpenter or Painter.

You can pay us for your training out of your salary, after you have secured a good position. Let us tell you how some of our boys are doing. Write today for application blanks and particulars.

GET AHEAD

STAY AHEAD

WINONA TECHNICAL INSTITUTE

1300 E. Michigan St.

INDIANAPOLIS, INDIANA



MECHANICAL DRAUGHTING

PRACTICAL WORKING DRAWINGS FOR SHOPS, DESIGNERS, INVENTORS

P. G. STEARNS, 39 HENDRIX STREET, BROOKLYN, N. Y.

LEARN TELEGRAPHY BOOKKEEPING OR SHORTHAND

BY MAIL--AT YOUR OWN HOME

Anyone can learn it easily in a few weeks. We are unable to supply the demand for telegraph operators, bookkeepers and stenographers. No charge for tuition until position is secured. Write today for particulars.

MICHIGAN BUSINESS INSTITUTE,
580 Institute Building, Kalamazoo, Mich.

\$5 EARN \$5.00 A DAY \$5

Learn to be a plumber in from 4 to 6 months, on easy payments. For particulars address

MASTER PLUMBERS' TRADE SCHOOL, 3415 LINDELL AVENUE, ST. LOUIS, MO.

BIG POST CARD OFFER

Here is our wonderful introductory offer on Post Cards. Take advantage of it while it lasts. Write today.

20 funniest, most original, catchy comic cards ever offered, no two alike. 25c

32 art cards, absolutely new, in beautiful colors, by America's ablest artists (one shown in ad), no two alike. 75c

25 CARDS FREE—To those sending \$1 now for both sets we will include, absolutely free, 25 cards of new and catchy subjects. Our line of art, fancy, comic, leather, photographic souvenir cards, is the largest, latest, most complete and exclusive on the market. Local view cards in de to order from your own photographs.

DEALERS Write for special prices and catalog listing 10,000 subjects, imported and domestic. Big profits; large sellers. BOOTH, WALLACE & CO., Dept D5, 155 Washington Street, CHICAGO



If you are interested in any kind of a Firearm, write for our beautiful "Gun Guide and Catalog" for 1907. It's FREE

Gives more points on guns than any catalog published. Gives best prices and most complete line.

THE HOPKINS & ALLEN ARMS CO.
32 Chestnut St., Norwich, Conn., U. S. A.

Learn Watch Repairing

Be a watchmaker—you can learn this profitable trade by correspondence in a few weeks in your own home by the DeSelms Chart System. After you complete the course you will know a watch from A to Z. You will know just what the matter is and how to repair one. When you graduate you will be a practical watchmaker and repairer and competent to fill any position. Positions for our graduates.

Ask for our Free Book. It explains our system and terms.

THE DeSELMS WATCH SCHOOL
23 Perry St. ATTICA, INDIANA



BE A RAILWAY MAIL CLERK

Earn \$83 to \$130 a Month—Work Only Half the Time. We prepare you by mail to pass a successful Civil Service Examination.



Most complete course. Uncle Sam wants Mail Clerks. Write today for free catalog and special offer.

The Wenthe Corres. School,
Box 505, Freeport, Illinois



DO YOU LIKE TO DRAW? That's All We Want To Know.

Now we WILL NOT give any GRAND PRIZE—or a lot of FREE STUFF if you answer this ad. Nor do we claim to make you RICH in a WEEK. But if you are anxious to develop your talent with a successful cartoonist, so you can MAKE MONEY, send a copy of this picture, with 6 cents in stamps for portfolio of CARTOONS and SAMPLE LESSON plate and let us explain. THE W. L. EVANS SCHOOL OF CARTOONING, 621 Garfield Bldg., Cleveland Ohio

¶ One of these books is issued the first of each year, and is a reprint of all the articles which have been published during the year past, in our "Shop Notes Department." Three volumes of the series are now ready.

200 Pages Vol. I, "Shop Notes for 1905." 385 Illustrations

228 Pages Vol. II, "Shop Notes for 1906." 555 Illustrations

228 Pages Vol. III, "Shop Notes for 1907." 586 Illustrations

THE PRACTICAL EXPERIENCE OF HUNDREDS OF EXPERTS CONDENSED IN THREE VOLUMES

¶ These books are a perfect gold mine of information for every one interested in mechanics, or who uses tools for pleasure or as an occupation. Of equal value and help to the professional mechanic and the amateur.

¶ These articles are the cream of the experience of years, of hundreds of the most successful mechanics in the country. There is nothing on the market equal to these books at five times their price.

¶ The Popular Mechanics Shop Notes Series TELLS EASY WAYS TO DO HARD THINGS, and like Popular Mechanics, is "Written so you can understand it."

¶ These books are indexed very fully and with great care.

¶ The subjects treated cover every department of mechanics, with useful time saving "kinks" for engineers, firemen, carpenters, machinists, plumbers, painters, iron and wood workers, electricians of all kinds, masons, and in fact all the trades. Special attention is devoted to the latest things, such as producer gas, cement working, etc., etc.

¶ Each volume contains entirely different matter from that published in the other. A set of these books covering several years will make an encyclopedia of priceless value to the owner.

Price 50 Cents per Volume, Postpaid

POPULAR MECHANICS,

CHICAGO

Shop Notes for 1908

**“Written so you can understand it”
Vol. 4, Ready November 15, 1907**

Best Volume of the Series. 200 pages and 500 illustrations. Contains matter entirely different from Vols. 1, 2 and 3. A copy of the 1908 “Shop Notes” added to your set will double its value.

Notice to Newsdealers

A stock of the Popular Mechanics Shop Notes Series is carried in stock by all branches of the American News Co., and your orders will be filled promptly. Usual discount to dealers.

The books are returnable; no time limit.

The Shop Notes sell throughout the entire year.

**For sale on all News Stands
or sent postpaid by the publishers.**

: : Price 50 cents : :

Popular Mechanics Co.

160 Washington St. : : : Chicago, Ill.

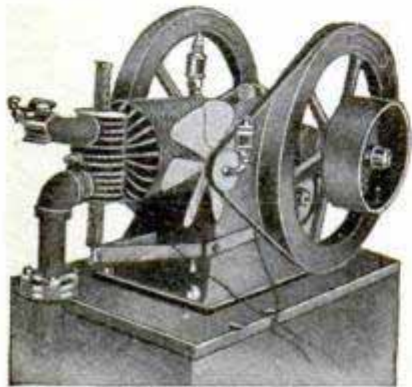
NEW YORK SCHOOL OF AUTOMOBILE ENGINEERS

**You Can
Earn \$25 to \$100 a Week**

Our course of study will fit you in two months to be a Chauffeur, Auto Salesman or Garage Manager, and there is no better paid occupation nor pleasanter work in the world. Our Home Study Course by mail gives full instruction by charts and text, and does not interfere with your present occupation. Our graduates are recognized as experts and good positions seek them. **WRITE TODAY** for free prospectus. Personal teaching with road practice at our big New York School if preferred.

NEW YORK SCHOOL OF AUTOMOBILE ENGINEERS, 130 West 56th St., N. Y.

AIR COOLED MOTORS



**1 1/2 H. P. to
10 H. P.**

1 1/4 and 2 1/4 H. P. equipped with short connections for spray pump and walking beam attachment for pumping water from wells. Will work against 200 pound pressure all day without heating. Gasoline in base of engine.

Write for agency

AIR COOLED MOTOR CO., Lansing, Mich.

URNS ANIMALS TO STONE.—An Italian chemist has arrived in the United States to try and convince the scientific men that he has found a way to turn organic substances into stone.

He claims to have discovered the process by accident a number of years ago in Peru, while experimenting with preservatives on eggs. He bored tiny holes in the eggs and tried injecting various chemicals. In trying one powerful drug he injected a small quantity into several eggs and two hours later found them as hard as rock.

Returning to Italy, it is claimed he drew around him a number of doctors and gave demonstrations. The body of a dog was petrified in a standing position, and the animal was made to look as natural as life. Beetles, frogs, snakes and other small animals were put through the process, and, after being petrified, retained their lifelike appearance. In each instance the chemist inoculated the specimen with a small quantity of the mysterious drug by means of a hypodermic syringe, without allowing the spectators to see the chemical. After the injection he placed the subject before them so they could watch the process of petrification as it went on. Three hours, the chemist claims, is all the time necessary to complete the petrification. He asserts that the objects will retain their lifelike appearance, even to the luster of the eyes, and last forever. He wants to preserve the dead in this way.

ADAM.*

Adam, made of common earth,
Seemed to be of little worth.
Giving him his full desert,
Still he seemed as cheap as dirt.

Smacked a good deal of the soil,
Adam did, but shirked all toil.
Yet he asked no man for trust,
Being simply made of dust.

Sandy beard and sandy hair;
Also had a stony stare;
And before his flesh ran blood
I suppose his name was mud.

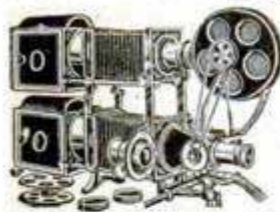
Poor old Adam, formed in clay,
Wasn't of the stuff to stay.
One more process was required;
That's the reason he was fired.

*In "Rimes to be Read," by Edmund Vance Cook, Dodge Publishing Company.



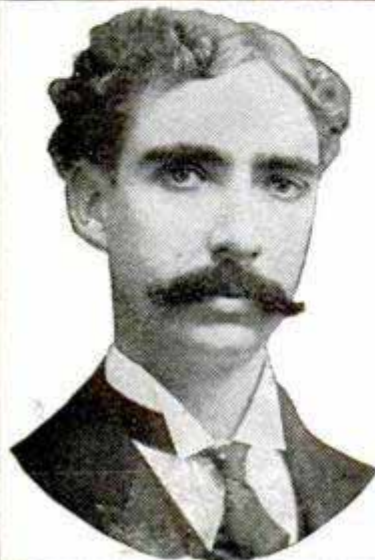
Pencil Pistol: Exclusively a weapon for defense; size of pocket knife; a protection against hold-ups. 32 caliber. \$1.50, prepaid.
C. S. Webber,
220 North State St. CHICAGO

IT PAYS BIG To Amuse The Public With Motion Pictures



NO EXPERIENCE NECESSARY as our instruction Book and "Business Guide" tells all. We furnish Complete Outfits with Big Advertising Posters, etc. Humorous dramas brimful of fun, travel, history, religion, temperance work and songs illustrated. One man can do it. **Astonishing Opportunity** in any locality for a man with a little money to show in churches, school houses, lodge halls, theatres, etc. **Profits \$10 to over \$100 per night.** Others do it, why not you? It's easy; write to us and we'll tell you how. **Catalogue free.**

AMUSEMENT SUPPLY CO., 471 Chemical Bank Bldg., Chicago



I STOP FALLING HAIR CONSULT ME BEFORE IT IS TOO LATE

There is but one way to tell the reason of baldness and falling hair and that is by a microscopic examination of the hair. The particular disease with which your scalp is afflicted must be known before it can be intelligently treated. The use of dandruff cures and hair tonics, without knowing the specific cause of your disease, is like taking medicine without knowing what you are trying to cure. **Send a few fallen hairs** from your combings to Prof. J. H. Austin, the celebrated Bacteriologist, who will send you, **absolutely free,** a diagnosis of your case, a booklet on care of the hair and scalp, and a sample box of the remedy which he will prepare specially for you. Enclose 2c postage and write to-day.

PROF. J. H. AUSTIN,

1107 McVicker's Theatre Bldg., CHICAGO, ILL.



THE FAYE AIR MOISTENER



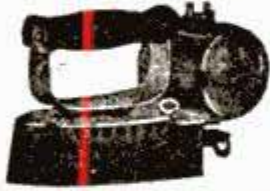
Hangs on back of steam or hot water radiators, out of sight, works automatically, preserves health; all doctors recommend it. Ask your's.

Send us \$2.00, use it 30 days, if not more than satisfactory, money refunded.

Descriptive Booklet No. 210, FREE.

ORR & LOCKETT HARDWARE CO.
Dealers and Agents Wanted. CHICAGO, U.S.A.

"COMFORT" SELF-HEATING FLAT IRON \$5



Safe Simple Economical
AGENTS Wanted Everywhere

Costs ONE CENT per day. Makes its own gas. No hot stove. Most convenient and economical household article ever invented. For further particulars and printed matter, write

THE HAWKES FLAT IRON CO.
375 Dearborn St., Chicago

SHOP TALK.

Said the engine, "I drink only water, and still I could get on a toot if required.
I can tender my own resignation at will,
But I never can go till I'm fired.

"I get hot when I'm coaled, but I never can shirk
Nor be switched from my purpose so active;
I rail not at fate, but I puff my own work
And ex-steam it as something at-track-tive.

"I have only one eye, which may seem rather queer,
Till you think, if you haven't already,
That engines like I am have only one ear—
The engineer, sober and steady.

"My train rushes on like an arrow swift sped,
Till I put on my brakes and I slack her;
I chew, chew, whenever I coax her ahead,
And likewise I chew, chew, to back 'er."
—Nixon Waterman, in S. F. Employees' Magazine.

Classified ads 3c a word. 300,000 readers. Best results for lowest cost.

TRAITOR SMOTHERED IN FLOUR.—From Riga, Russia, comes the story of a horrible revenge taken by revolutionists upon one of their number who had betrayed them to the police.

The central revolutionary committees of Courland, Livland and Estland used an old mill just outside Riga for their meeting place. A man named Sproge, who had broken with the revolutionaries, betrayed them to the police. Officers went to the old mill, surrounded the place and called on the revolutionaries to surrender. In trying to escape thirty of the conspirators were shot and killed. Many others were captured.

Sproge's treachery was discovered and other revolutionists decided to kill him by frightful tortures. He was captured and taken to the same mill where the revolutionaries had met. There he was tied to the floor and a loose sack with a small hole fastened about his head. A stream of flour was allowed to run through the hole. Ultimately the sack was completely filled and Sproge was slowly smothered.

The revolutionaries left the body there with a note of warning to other traitors.

DON'T WEAR A TRUSS

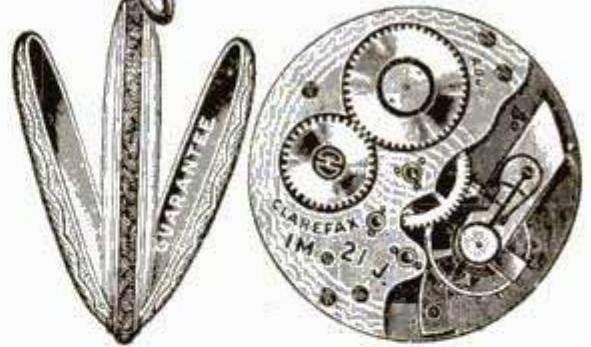


Brooks' Appliance is a new scientific discovery with automatic air cushions that draws the broken parts together and binds them as you would a broken limb. It absolutely holds firmly and comfortably and never slips, always light and cool and conforms to every movement of the body without chafing or hurting. I make it to your measure and send it to you on a strict guarantee of satisfaction or money refunded and I have put my price so low that anybody, rich or poor, can buy it. Remember, I make it to your order—send it to you—you wear it and if it doesn't satisfy you,

you send it back to me and I will refund your money. The banks or any responsible citizen in Marshall will tell you that is the way I do business—always absolutely on the square and I have sold to thousands of people this way for the past five years. Remember, I use no salves, no harness, no lies, no fakes. I just give you a straight business deal at a reasonable price.

C. E. BROOKS, 508 1/2 Brooks Building, Marshall, Mich.

This \$20 Watch for \$5.45



These figures tell exactly what we are doing—selling a \$20.00 watch for \$5.45. We don't claim that this is a \$40.00 watch or a \$50.00 watch, but it is a \$20.00 watch. A leading watch manufacturer, being hard pressed for ready cash, recently sold us 100,000 watches—watches actually built to retail at \$20.00. There is no doubt that we could wholesale these to dealers for \$12.00 or \$13.00, but this would involve a great amount of labor, time and expense. In the end our profit would be little more than it is at selling the watch direct to the consumer at \$5.45. This Clarefax Watch, which we offer at \$5.45 is **ruled jeweled**, finely balanced and perfectly adjusted movement. It has specially selected jewels, dust band, patent regulator, enameled dial, jeweled compensation balance, **double hunting case**, **genuine gold** and handsomely engraved. Each watch is thoroughly timed, tested and regulated before leaving the factory and both the case and movement are **guaranteed for 20 years**.

Send us your name, post-office address, and nearest express office and name of this paper. Tell us whether you want a ladies' or gent's watch and we will send the watch to your express office at once. If it satisfies you, after a careful examination, pay the express agent \$5.45 and express charges and the watch is yours, but if it doesn't please you return it to us at **our expense**.

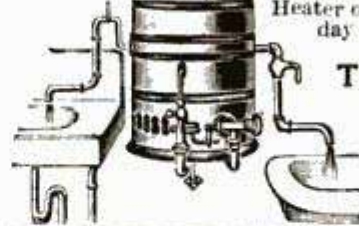
A **20-Year guarantee** will be placed in the front case of the watch we send you and to the first 1,000 customers we will send a beautiful gold-link watch chain, free. **No refer to the First National Bank of Chicago, Capital \$10,000,000.**

NATIONAL CONSOLIDATED WATCH CO.
Dept. 675, CHICAGO.

When You Want Anything and Don't Know Where to Find It, Write Popular Mechanics.

ACME HEATER

The most perfect and efficient Water Heater made. Light gas, instantly hot water will flow at the rate of four gallons per minute. It costs less than 2 cents to fill a bath tub. Will ship Heater on 30 days' free trial. Write today for Complete Catalog No. 12.



THE INSTANTANEOUS WATER HEATING COMPANY

153-159 S. Jefferson St.
CHICAGO

PRINTING 100 Letter heads, 100 Envelopes, 100 Cards, all three for \$1.50, postpaid. Visiting Cards, 100 for 35c; Shipping Tags, 100 for 40c. Samples, 2c. 100 Billheads or Statements, 50c.

RIHARD ELLIOTT, Box 1376, St. Louis, Mo.



New Lamps for Old

Should you have a Rochester that does not give satisfaction, return it to us, (if not injured) and we will give you a new one **FREE**.

The Rochester gives a soft, cheerful, mellow light of wonderful brilliancy, enabling weak eyes to read without straining. Made of brass throughout, any finish. Perfectly constructed, absolutely safe, **guaranteed**; millions in use.

We manufacture, import and deal in all sundries pertaining to light and heat—oil, gas, alcohol, electricity.

Agents wanted, men and women; experience unnecessary; permanent home employment, salary or commission. Send stamp for salesman's instructions and Lamp Information, the knowledge acquired through years of experience.

Rochester Lamp Co., Dept. AA, Rochester, N.Y.

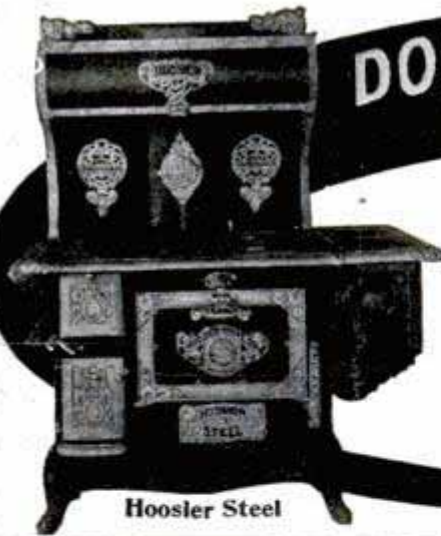
DON'T PAY TWO PRICES FOR STOVES & RANGES

Order direct from our Stove Factory and save for yourself all Jobbers' and Dealers' big profits.

HOOSIER STOVES AND RANGES

"The best in the world." Are sold on 30 days' free trial. We pay the freight. Guaranteed for years. "Backed by a million dollars." Hoosier's are "fuel savers and easy bakers." Very heavily made of highest grade selected material, beautifully finished, with many new improvements and features. Our large Stove and Range Catalog shows the greatest bargains ever offered. Write for catalog and Special Free Trial Offer.

HOOSIER STOVE CO., 249 State St.
Marion, Ind.



Hoosier Steel



Hoosier Oak

Fire Protection—Small Cost

If you want the surest fire protection for your factory, warehouse, place of business, home, etc., and at lowest cost, it will pay you to write us for full particulars. Our System in use by leading business houses all over the country. May we explain further?

FAIR MFG. CO., F9311 Fifth St., RACINE, WIS.

Make this \$25.00 Rocker for \$4.00

Send 75c. for full sized patterns and directions; also catalog of other patterns Satisfaction or money refunded.

HOME FURNITURE PATTERN CO.

615 First Nat. Bank Bldg., Birmingham, Ala.



THE VACUUM CAP CURES BALDNESS 60 DAYS' TRIAL

Thousands cured. Our MODERN VACUUM CAP WHEN USED A FEW MINUTES EACH DAY draws the blood to the scalp and forces the hair into new healthy growth, cures baldness and stops the hair from falling out. Cures Dandruff. Harmless and healthful. We send it to you on trial. We only want pay if you are pleased. Is not this fair? Write for free booklet.

THE MODERN VACUUM CAP CO.
664 BARCLAY BLOCK DENVER, COLO.



ARE YOU GOING TO ST. LOUIS?

The HOTEL WINDERMERE is a delightful place in the Best Resident Section and away from the noise and smoke; yet within easy access. Transient Rate: \$1.00 to \$3.00 a day, European Plan. Special Rates by the week. Write for Booklet.

Address, W. F. WILLIAMSON, Manager.



Press
your
trousers

over night at home.

Send for booklet and prices.

Use it 60 days. Money returned if not satisfactory.

PERFECT PANTS PRESSER CO.

216 So. 5th Ave.

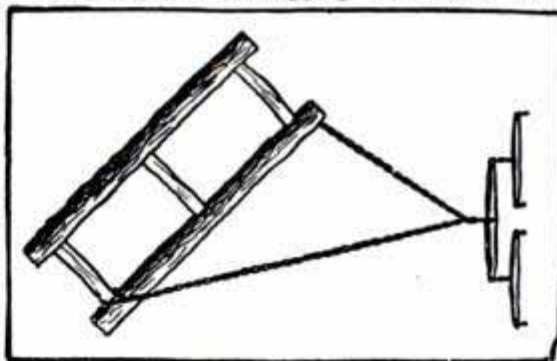
Maywood, Ill.



The Walworth (Wis.) Times, after describing what was formerly "the worst dirt road in the state," says:

"But all this is changed. Now the road is never muddy in rainy weather and there is almost no dust in dry weather, and better still the road is in condition so that it can be kept in this desirable dustless and mudless state for an annual cost of only three to five dollars per mile.

"All this sounds like a difficult thing to do but it was simple as could be. Mr. Gibson cut the brush along his road, plowed the sides, turned the dirt in toward the center with a road grader and made a good rounded grade of such a shape that the water readily found its way to the ditches. So far he did just like any other road overseer does with his road machine. But Mr. Gibson went farther. He took forks and threw the sods outside the ditches and harrowed the soft newly made grade to settle it and make it even. Then after the first rain he went over it with a King split-log road drag to fill up the ruts which the travel had made in the still loose dirt of the grade. He repeated the dragging after each subsequent



rain and after a few such treatments had a road on which a heavily loaded wagon made hardly any impression even right after a rain when most clay roads would be all mud.

"This road drag was made for the town by the local blacksmith for about five dollars. It consisted of an 8-in. log split into two pieces. These pieces were set up with the flat faces forward and connected with wooden braces to hold them about 30 in. apart. For about half its length the front log was shod along the lower side of the face with steel and provided with a chain to draw the apparatus by. A team was hooked on the chain in such a manner that as the drag was pulled along it lay at an angle with the road and worked a little of the dirt toward the center to fill the ruts.

"By going over the roads after every rain a little soft puddled clay was dragged toward the center filling the ruts and keeping up the good rounded shape of the grade so

Photographs Wanted

Photographs of new and interesting subjects, suitable for publication in this magazine, may be submitted to its editor and those accepted will be paid for promptly.

Address: Editor Popular Mechanics
160 Washington St. :: :: Chicago

DO YOU SHAVE YOURSELF?

Then get a brush, the hairs of which will never come out. Our new EVERLASTING SHAVING BRUSH has the hairs cemented and set in an aluminum ferrule by our patent process; guaranteed perfect for three years.

A new brush free if a single hair comes out.

SPECIAL: To introduce our catalog of razors and supplies for home shaving, we offer this 75c brush for

Complete catalog on home shaving FREE.
HOME BARBER SUPPLY CO., 283 E. Madison St. Chicago



MASSAGE YOUR EYES WITH THE

IDEAL EYE MASSEUR

The safest, surest and most scientific treatment for the eyes

If you wear glasses, if your eyes smart or burn or get red and inflamed, if you have headaches or your eyes are glassy or strained, write for our Illustrated Treatise on the Eye. It contains a wealth of valuable information about the eye.

Indistinct vision, muscular troubles and chronic diseases of the eye successfully treated. A few minutes use of the Restorer each day will effect a steady improvement in the sight. English, German, or Spanish pamphlet mailed FREE.

THE IDEAL SIGHT RESTORER

treats the eye in nature's own way and permanently restores the sight to its normal condition. Read the testimonials, you probably know some of those whom we have wonderfully helped. Write to-day.

THE IDEAL COMPANY, 239 M, BROADWAY, NEW YORK.

that water ran off readily. This puddled clay was packed into the ruts by the travel and dried hard as brick so that it became steadily harder for wheels to cut any ruts in it, thus it came about also that the road was not cut up into big clods which could dry and be pounded into dust and so the road is nearly dustless in dry weather."

The world uses at least 170,000,000,000 matches yearly.

In Palestine gas engines have of late years been replacing the old water-wheels for irrigation purposes in the 800 or 900 orange gardens in the neighborhood of Jaffa.

Pennsylvania alone produced last year nearly three-quarters of a million tons pig iron more than the whole of Great Britain.

It is estimated that John D. Rockefeller's income from Standard Oil for the past ten years has been \$110,000,000.

The wool of the sheep forms an excellent weather prophet. When it is crisp there will be no rain. On the other hand, when it is limp and feels very soft to the touch, a storm is imminent.

LET ME SELL YOUR PATENT

Booklet explaining how mailed FREE. Sixteen years' experience. Patent Sales exclusively. If you have a PATENT for sale, call on, or write

WILLIAM E. HOYT
PATENT SALES SPECIALIST
290 (J) Broadway, New York City



NEVER-LOSE RULE CLAMP

Where's my rule?
Another rule to buy



The Never-Lose Clamp is easily adjusted to fit any rule and is always ready to take or give up your rule instantaneously. Every mechanic should have one of these very useful articles, which we send to any address on receipt of 15 cents. MONEY BACK if dissatisfied with it.

State and County Rights for sale by our new plan. Write.
Mr. J. T. MOYER, :: Milford Square, Penna.

Turn Your Spare Time Into Money

☞ We would like to communicate with ambitious men and boys who would like to improve their spare time.

☞ Why not make more money?

☞ By our plan this is not a difficult thing to do.

☞ Write us and we will send full particulars by return mail.

DESK A

Popular Mechanics

CHICAGO, ILL.

MAKE A STOVE of your LAMP or GAS JET

by attaching a

GIANT HEATER

On Mantle Burner.

Getting Heat and Light at One Cost.

The Giant Heater so applied will heat any ordinary room comfortably in zero weather, and without interfering with the light.

There is no more gas or oil consumed with the heater attached than without.

This heater is a scientifically constructed brass globe that accumulates, in essence and radiates the heat from your central draught lamp or gas jet that ordinarily goes to waste—giving a thorough and uniform heat.

Attracts cold air on the vacuum principle, thoroughly warming, purifying and circulating it. No odor, no ashes nor trouble.

This Giant Heater will fit any lamp chimney, gas jet or mantle burner. Absolutely no danger, as heater in no way interferes with the combustion.

There isn't a home in the country that does not at some time in the year need a Giant Heater—and some need it all the time—for the bath room, sick room, bed room, den or office; for light cooking, heating water for shaving, warming babies' food etc.

Mrs. A. H. HILBERTS, Four-lu-Lac, Wis., writes We find the Giant Heater the finest thing in the world in our guest chamber, as it takes the place of the stove, without taking up any room.

Price, Polished Brass, Complete, \$1.50
Nickel Plated on Brass, \$2.00

Send to-day for a heater—we will send it by first express or mail, all charges prepaid.

Satisfaction guaranteed or money refunded if returned in ten days. Booklet and testimonials upon request.

GIANT HEATER CO.,

127 Monmouth St., Springfield, Mass. On Gas Flame



On Round-Wick Lamp.



Build This Boat Yourself



with Pioneer Perfect Frames, the ONLY frames having been built to EXACT SHAPE, SET UP TRUED, TESTED AND REVEALED for PLANKING before being knocked down for shipment to you.

Pioneer Perfect Frames save ALL the hard work, and two-thirds the cost of a similar complete boat. REMEMBER, with Pioneer Frames we furnish, absolutely FREE, patterns and instructions for completing your boat.

Order your Frames TODAY on the EASY PAYMENT plan and see for yourself the SIMPLICITY of the Pioneer system. If you haven't time, or cannot get material conveniently to complete your boat yourself, write us for low-priced, perfect DECKING, PLANKING FITTINGS, ENGINE, etc. Write TODAY for FREE Book of Pioneer Perfect Frames, Full-Size Patterns of every part, etc., or send 25c for 104-PAGE BOAT BUILDERS BOOK, 300 illustrations. All about types of boats, engines, etc. Money back if not satisfied.

The Pioneer Boat and Pattern Co.
Wharf 160, Bay City, Mich.



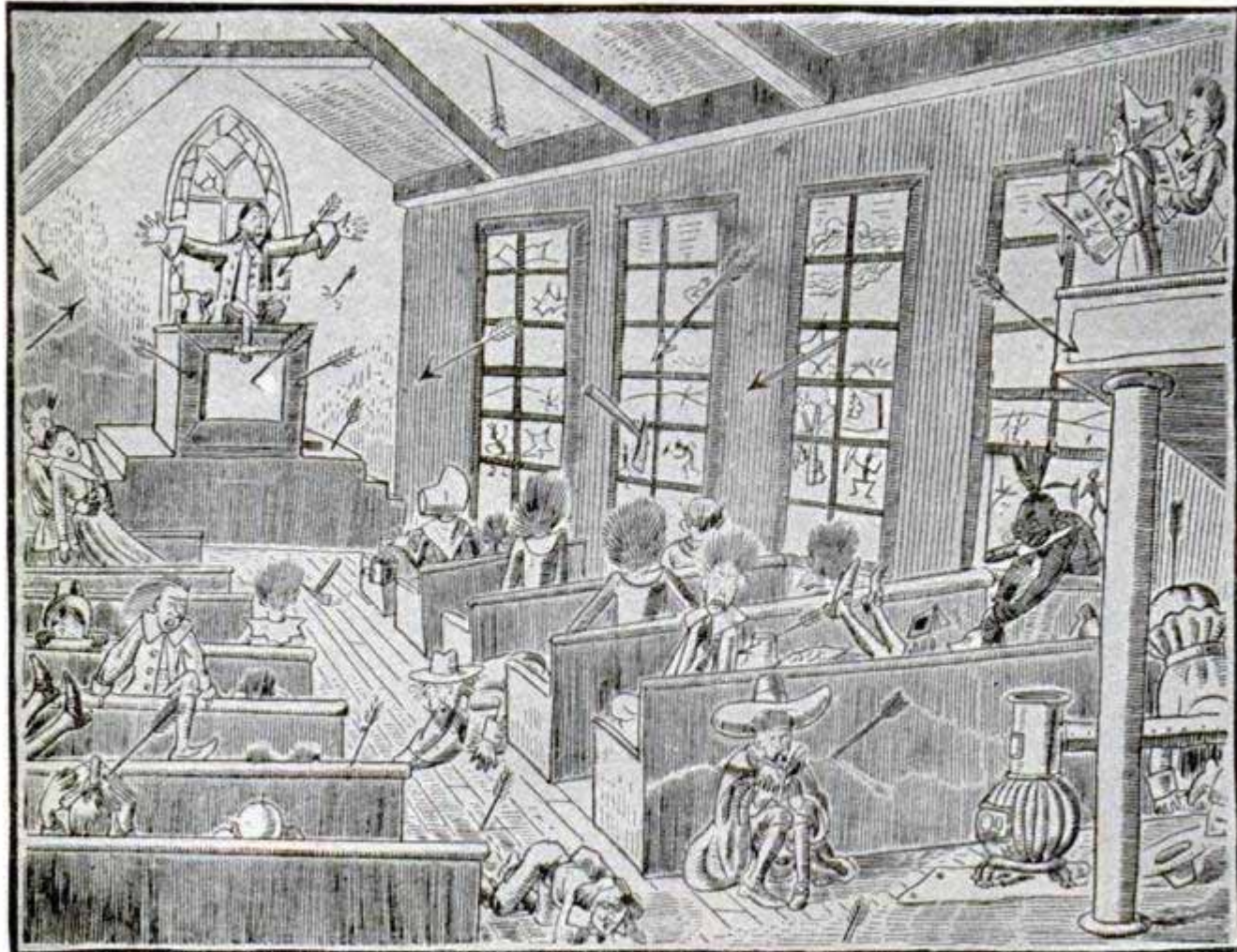
MELLO-TONE

Attachment, a great improvement for the Talking Machine or Phonograph. Produces tones natural. Eliminates all metallic sounds and blasts. Regulates and mellows the tone. Can be adjusted while machine is playing. Goes in the horn, opens and shuts.

Retail Price, \$1.00 Each

MELLO-TONE CO. :: Springfield, Mass.

Added to the growing scarcity of timber generally comes a report from Seattle that the teredo has made such havoc with the big booms of logs in Puget Sound that it has ruined much of this year's cut, one big company alone reporting a loss of over 18,000,000 feet. The Department of Agriculture and the Bureau of Forestry is trying its best to find a remedy for this condition, but has not yet discovered it.



The Thanksgiving of Our Forefathers

(Courtesy Hartman Book Co.)

MAKE STEAM with Kerosene

5 POINTS which make a Perfect Steam Power Unit

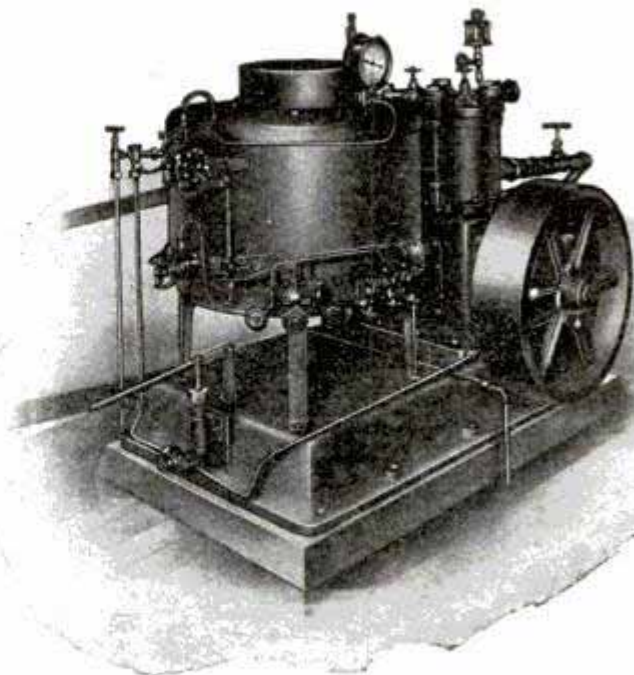
POWER—Always there.

ECONOMY—Kerosene, costs less than coal, no smoke, no ashes, no odor, one cent per horse power hour.

SAFETY—Any boy can run it.

DURABILITY—Practically indestructible, with ordinary care.

ADAPTABILITY—Anything a small power plant can be used for, Mines, Irrigation, Small Shops and Electric Light Plants, Factories, and especially places where space is an object or fuel an important item. Light and easily transported. No stack required.



These points place the **BARTON FLASH BOILER SYSTEM** in the front rank
10, 15 and 20 H. P. Outfits

BARTON BOILER CO., 2427 CALUMET AVE.
CHICAGO, ILL.

25c. BOOKS 25c.

ELECTRICITY. The study of, and its laws for beginners, comprising the laws of electric current generation and flow, Ohm's law, galvanism, magnetism, induction, principles of dynamos and motors, wiring, with explanations of simple mathematics as applied to electrical calculations. By N. H. Schneider. With 55 original illustrations and 6 tables. 25 cents, postpaid.

DRY BATTERIES. A practical handbook on the designing, filling and finishing of dry batteries, with tables, for automobiles, gas engine, medical and coil work, electric bells, alarms, telephones, experiments, and all purposes requiring a first-rate battery. Fully illustrated with 30 original drawings. 25 cents, postpaid.

ELECTRICAL CIRCUITS AND DIAGRAMS. Being a selection of original up-to-date and practical diagrams for installing annunciators, alarms, bells, electric gas lighting, telephones, electric power light and wiring circuits, induction coils, gas engine igniters, dynamos and motors, armature windings. By N. H. Schneider. 25 cents, postpaid.

ELECTRIC BELLS AND ALARMS. How to install them. By N. H. Schneider. Including batteries, wire and wiring, circuits, pushes, bells, burglar alarms, high and low water alarms, fire alarms, thermostats, annunciators, and the locating and remedying of faults. With 56 original diagrams. 25 cents, postpaid.

MODERN PRIMARY BATTERIES. Their construction, use and maintenance, including batteries for telephones, telegraphs, motors, electric lights, induction coils, and for all experimental work. By N. H. Schneider. 94 pages, 55 illustrations. The best and latest American book on the subject. 25 cents, postpaid.

EXPERIMENTING WITH INDUCTION COILS. H. S. Norrie, author of "Induction Coils and Coil Making." A most instructive little book, full of practical and interesting experiments, fully explained in plain language with numerous hints and suggestions for evening entertainments. Arranged under the following headings: Introduction; The Handling of Ruhmkorff Coil; Experiments with Sparks; Effects in the Vacuum; Induction and Wireless Telegraphy. With

36 original illustrations. [In the press.] 25 cents, postpaid.

ELECTRIC GAS LIGHTING. How to install electric gas igniting apparatus, including the jump spark and multiple systems for all purposes. Also the care and selection of suitable batteries, wiring and repairs. By H. S. Norrie. 101 pages, 57 illustrations, paper. 25 cents, postpaid.

THE LOCOMOTIVE, simply explained. A first introduction to the study of the locomotive engine, their designs, construction and erection, with a short catechism, and 26 illustrations. 25 cents, postpaid.

WOODWORK JOINTS. How to make and where to use them; including mortise and tenon joints, lap joints, dovetail joints, glue joints and scarfing joints. With a chapter on circular woodwork, revised and enlarged edition, 101 pages, 178 illustrations. 25 cents, postpaid.

SMALL ELECTRICAL MEASURING INSTRUMENTS, describing the making and using of the different instruments, fully illustrated. 25 cents, postpaid.

METAL WORKING TOOLS AND THEIR USES. A Handbook for Young Engineers and Apprentices. Shows how to use simple tools required in metal working and model making. Illustrated. 25 cents, postpaid.

THE SLIDE VALVE. Simply explained for working engineers. Fully illustrated. 25 cents, postpaid.


DIAGRAM OF CORLISS ENGINE. A large engraving giving a longitudinal section of the Corliss engine cylinder, showing relative positions of the piston, steam valves, exhaust valves, and wrist plates when cut-off takes place at $\frac{1}{4}$ stroke for each 15 degrees of the circle. With full particulars. Reach-rods and rock shafts. The circle explained. Wrist plates and eccentrics. Explanation of figures, etc. Printed on heavy paper, size 13 in. x 19 in. 25 cents, postpaid.

INDUCTION COILS. A practical handbook on the construction and use of shock and spark coils. With 35 illustrations. 25 cents, postpaid.

JOINT WIPING. Practical hints for beginners in plumbing. Fully illustrated. 25 cents, postpaid.

POPULAR MECHANICS

160 Washington St., :: CHICAGO



Hamilton ²² caliber Rifle
\$1.50 Model No. 27

A Real Rifle for the Real Boy

The Hamilton is an efficient fire arm, using 22 caliber short or long cartridges. Sold at this low price because of special methods in manufacture, covered by exclusive, patent rights.

The Hamilton is a genuine sportsman's rifle on smaller lines, is beautifully modeled and perfectly balanced. The barrel is of bronze, rifled and steel jacketed. No liability of rust. Breaks down to eject empty shells and for loading. When loaded, barrel is securely locked, affording safety from blow back.

The Hamilton is equipped with front knife sight and open adjustable rear sight.

Every Hamilton Rifle is fully guaranteed. If your dealer hasn't it, write direct for booklet E, to **HAMILTON RIFLE CO., Plymouth, Mich.**



Mount Birds You Kill
 Write Today
 Learn at home by mail the wonderful art of Taxidermy. We guarantee to teach you or no tuition. Preserve animals, game heads, fish. Keep rare specimens that soon will be extinct and very valuable. Earn lots of money by being a professional taxidermist. Send for book "How to Mount Birds and Animals" FREE. N.W. School of Taxidermy, Box 58E., Omaha, Neb.

Do You Want to Hear




the conversation of your friends—music—singing? Are you "hard of hearing" and denied these pleasures? If you are not totally deaf—nor born deaf—your hopes may revive, because relief is at hand. The Way Ear Drums (which I invented and protect by patents in the U. S., also in foreign countries), gave me perfect hearing after 25 years of deafness. **They will help you.** If you have tried other ear drums without success, do not infer that mine will also fail. Way Ear Drums are entirely different from any other on the market. They are invisible, do not hurt, will not collapse in the ear and are

so sensitive that they catch the faintest sounds. Easily placed. Write today the cause of your deafness.

WAY EAR DRUM CO., :: 1115 Majestic Bldg., Detroit, Mich.

How to Make a Culpepper's Ghost
 WILL BE DESCRIBED IN THE
 December Number of **POPULAR MECHANICS**



BARODA DIAMONDS
 Flash like the genuine—at 1/30 the cost
SOLID GOLD MOUNTINGS
 Stand acid test and expert examination. See them first, then pay. Catalog FREE. Patent Ring Gauge included for 5 two-cent stamps. The Baroda Co., Dept. M, 230 North State St., Chicago



Play the Game
POLITIX
 That's never Tame


THE GREAT AMERICAN GAME
 POLITIX, 52 cards, each representing a state. 4 suits, instead of hearts, diamonds, etc. 4 political parties, denoted by the regular party emblem. Keeps you busy, interested, excited. Every game played is a presidential election. The combinations are unlimited and surprising. No home should be without this great game. 50c post-paid. Circular free. **MILLER & GOULD, 605 D. Pullman Bldg., Chicago.**



AGENTS
\$100 A MONTH EASILY MADE selling our "LIGHT-NING SELLING" TRANSPARENT HANDLED POCKET KNIVES. Name and address on one side; photo and lodge emblem on the other. Just the right thing for a nice present. Write TODAY for agents' terms. **GOLDEN RULE CUTLERY CO., 40-9 Wendell Street, CHICAGO.**

Electrical Supplies
For the Amateur
 Lowest prices :: Send Stamp for Catalogue
THE BRIDMAR CO., Chicago, Ill.

Rheumatism **SUCCUMBS** to the **TREATMENT** of
Richmond's Rheumatic Eradicator
 Price, \$2.00 Prepaid Does Not Blister
RICHMOND LINIMENT CO., Chemists
 Hartford, Conn., U. S. A. Department 1



The Pathfinder \$1 A YEAR
 EVERY WEEK
 THE NATIONAL NEWS REVIEW
 YOU want The Pathfinder of Washington, no matter what other periodicals you may read. It is "different"—sprightly, informing, inspiring, entertaining, yet dignified and sane. No axe to grind. A non-partisan illustrated weekly from the Nation's Capitol for the Nation—15th year of steady growth. Send \$1 for 1 year. Or test it 13 weeks for 25c. **THE PATHFINDER, :: Washington, D. C.**

WANTED AT ONCE. Distributing Managers to represent established mail order firm; no capital or experience required; no deposits to collect \$100 per month and expenses. **SAUNDERS CO. Dept. C, Fifth Ave., Chicago.**



Geisha Diamonds
 THE LATEST SCIENTIFIC DISCOVERY
 Bright, sparkling, beautiful. For brilliancy they equal the genuine, standing all test and puzzle experts. One twentieth the expense. Sent free with privilege of examination. For particulars, prices, etc., address
THE R. GREGG MFG. & IMPT. CO.
 Dept. H, 201 E. Van Buren Street, Chicago, Ill.

Be Your Own Boss!
MANY MAKE \$2,000.00 A YEAR. You have the same chance. Start a mail order business at home. We tell you how. Money coming in daily. Very good profits. Everything furnished. Write at once for our "Starter" and FREE particulars.
P. M. KRUEGER CO., 155 Washington Street, Chicago, Ill.



GROW MUSHROOMS
 For Big and Quick Profits or For Your Own Use.
 I can give practical instructions worth many dollars to you. No matter what your occupation is or where located, get a thorough knowledge of this paying business. Particulars free. **JACKSON MUSHROOM FARM, 3243 N. Western Ave., B-30, Chicago.**

When You Want Anything and Don't Know Where to Find It, Write Popular Mechanics.

BUSINESS OPPORTUNITY
 Men of Business interested in a new field for making money will find in our proposition what they are seeking. We have a **New Plan** in the Mail Order Line that will please those seeking a good investment with large profits. A **Fortune** for the right person. **The F. H. Alden Co., 139 E. 4th St., Cincinnati, O.**

"Want" and "For Sale" Ads. 3 cents per word, payable in advance. Replies may be sent to a number, care Popular Mechanics, and will be forwarded without extra charge. In answering such, let the number appear on your envelope.

AUTOMOBILES.

AUTOMOBILE SCHOOL—Chicago School of Motoring; the original automobile school in Chicago. Four hundred and fifty graduates the past year, to whom we refer upon request. Automobile owners, prospective buyers and young men wanting to become expert chauffeurs will save a great deal of money and a lot of worry by studying the mechanism, care and repair of gasoline automobiles in our shop, where all parts are open so you can see how they are made, and how they operate. We give thorough and practical instruction. Competent chauffeurs supplied. Address Chicago School of Motoring, Dept. B., 264 Michigan Ave., Chicago, Ill.

20" AUTO BOILERS, each \$50; 18" auto boilers, each \$45. J. L. Lucas, Bridgeport, Conn.

FOR SALE—Orient Automobile Buckboard, in good running order; cheap to quick buyer. Address 111, care Popular Mechanics.

FOR SALE—Cadillac automobile engine and transmission, 10 h. p., with carburetor, spark coil, gasoline tank, pump and radiator; best of condition. \$125. Mitchell sliding gear transmission, aluminum case, \$30. Address Lock Box 54, East Palestine, Ohio.

FOR SALE—First-class 24 h. p. touring runabout; \$350, if taken at once. 49 Hastings St., Detroit, Mich.

10-DAY BARGAIN SALE—Michigan runabout, \$100; Olds, \$250; 18 h. p., 3 cylinder touring car, \$250; \$3,000 Stearns touring car, 30 h. p., top and glass front, \$850; White steamer, \$350; new \$900 steamer, \$250. Only a sample. Get bargain sheet. F. S. Culp, Canton, Ohio.

LET THE ENGINE DO THE WORK. Our new book tells how to convert your buggy or road wagon into a motor car, or your bike into a motorcycle, at moderate cost. Many mechanics build their own motor. Price per copy, postpaid, 25 cents in coin. Stanley Shaw, Galesburg, Kan.

AUTO SUPPLIES

GLASS FRONT for all cars. Get prices before ordering. Catalogue on request. H. S. Ross, 5607 S. Halsted St., Chicago.

AUTO TIRES CLOSING OUT SALE. New G. & J. Clincher Casings: 28x2½, \$10; 28x3, \$16.50; 30x3, \$17.50; 30x3½, \$21; 32x3½, \$22.50; 34x4, \$28. Dunlap Universal Casings: 30x3½, \$27; 30x3, \$25. Single Tube Tires: 28x2½, \$11; 26x2½, \$10; 28x3, \$12.50. Set New Oldsmobile Wheels, \$25; wire set, \$15; Holley Carburetor for Oldsmobile, \$10; Spark Coils, \$5; Auto Jacks, \$1.50. Shipment privileges of examination when enough comes with order to pay express. Cash Buyers Auto Co., Springfield, Ohio.

MOTORCYCLES

FOR SALE—1½ H. P. motorcycle engine, \$20; castings, \$6.50. C. E. Shook Manufacturing Company, Waterloo, Iowa.

2 H. P. MOTORCYCLE for sale, cheap. Address 110, care Popular Mechanics.

SAVE CHAIN TROUBLE by using Ball Bearing Fiber Idler, ready to apply to Indian or R-S motorcycles. For cut and prices apply to A. C. Mount, 158 Washington St., Elizabeth, N. J.

FOR SALE—MARSH 3 H. P. MOTORCYCLE, in good condition, except tires need new inner tubes. \$55. Address Harlie Barnes, Angola, Ind.

WANTED—Tandem motorcycle, cheap. Box 457, Frederickton, N. B.

FOR SALE—Merkel motorcycle. Excellent running condition. Photo and description on request. Address 113, care Popular Mechanics.

BUSINESS OPPORTUNITIES.

THEY WORK WHILE YOU SLEEP. Talking Scales. "They Speak Your Weight." The invention of the century. Fortunes have been made operating automatic weighing machines. Write to-day. United Vending Machine Co., 629 Caxton Bldg., Cleveland, Ohio.

START a mail order business; we furnish everything necessary; only few dollars required; new plan, success certain; costs nothing to investigate. Milburn-Hicks, 809 Pontiac Bldg., 358 Dearborn St., Chicago.

ANYBODY CAN MAKE GOOD CUTS with my simple zinc etching process; price, \$1; specimens and particulars for stamp. T. M. Day, Box M, Windfall, Ind.

ELEVEN HONEST BUSINESS PLANS and trade secrets, including plating process. A chance to be "your own boss" and make from \$15 to \$75 weekly. Circulars free. Ohio Enterprise Co., No. 280 W. Jefferson St., Springfield, Ohio.

START A BUSINESS OF YOUR OWN. No capital required; no experience necessary. Simply send us your name and address, with three good references, business men, and we will send you a complete line of high grade, fast selling perfumes and toilet articles. Goods on credit; no cash deposit. We furnish the goods; you sell them, retain half the money and remit balance to us each week. Fine paying permanent business quickly established. Write to-day, sending references. F. Raydith Perfume Co., 23 N. State St., Chicago.

DO YOU WANT TO INCREASE YOUR INCOME? Send stamp for sample of Kleenhand, with proposition that will interest you. Kleenhand Co., 56 Hubbell Park, Rochester, N. Y.

REPRESENTATIVE in every manufacturing city to handle Tat's Grit Soap. Big sales amongst mechanics. Write for particulars. Tatlock Bros., Rochester, N. Y.

I MADE \$50,000 in five years in the mail order business; began with \$5. Anyone can do the work in spare time. Send for free booklet; tells how to get started. Manager, Box 570, Lockport, N. Y.

WANTED—CAPITAL to promote large corporation to manufacture and market patented articles. Address C. M. Tompkins, Waukegan, Ill.

OPEN A MIRROR FACTORY IN YOUR TOWN, or travel and do the work, and make from \$5 to \$25 daily. **WE TEACH** and trust you, 10c brings 32-page booklet and full particulars; none without; no time for idlers. Hullinger's Mirror School, Francesville, Ind.

FOR SALE—My entire blacksmith and wagon shop, with or without stock and tools; cheap, and a good stand. Box 62, LoebSpring, Mo.

AGENTS—\$103.50 per month selling wonderful self-sharpening patented scissors and cutlery. V. E. Glebner sold 22 pairs in 3 hours, made \$13; you can do it. We show how. Free outfit. P. Thomas Mfg. Co., 162 D St., Dayton, Ohio.

BUSINESS CARDS.

EVERY ENGINE works better when packed with "Eureka Packing." Your dealer will furnish it.

GEO. W. RICHARDSON, CONSULTING ENGINEER, 819 Chamber Commerce Bldg., Chicago—Machinery inspected and purchased for parties in and out of the city. Patents secured, expert information furnished, engines indicated, valves set, complete reports made on steam, electric lighting and power plants.

PATENTS FOR SALE

PATENTS—The Popular Mechanics Patent Bureau renders efficient service. Following letter is dated May 25, 1907:

Dear Sirs: Please allow me to acknowledge the receipt of yours of the 13th, the official notice of the allowance of my application for patent on Paper Clips. I wish to say I am highly gratified with the efficient manner in which you have attended to my interest in this matter, and that the drawings and specifications were far ahead of my expectations, and that if I ever have any other work, I wish you to do it. I beg to remain, respectfully yours, John H. Atter, 439 Main St., Conneaut, O.

Write for free booklet, "What to Invent." Address Popular Mechanics Patent Bureau, 160 Washington St., Chicago.

PATENT FOR SALE—Automatic Damper Regulator. Can be sold without alarm clock. Have no cash to promote same. C. F. Miller, 34th St. and Greenwood Ave., Berwyn, Ill.

FOR SALE—Floor Surfer, patent No. 851518, issued April 23, 1907. Elmer Hodgson, Bonesteel, S. D.

MACHINERY FOR SALE.

PUMPS! Of Every Description—Suitable for Home and Factory use. Illustrated Catalogue Free. H. E. Trotman, 107 N. Third St., Philadelphia, Pa.

FOR SALE—Engine lathe, swings 9½ in., takes 25 in. between centers. Complete with full set change gears to cut all size threads, 3 to 40 in.; price only \$43.50. Address L. F. Grammes & Sons, Allentown, Pa.

RIFE AUTOMATIC HYDRAULIC RAM, pumps water by water-power—no attention—no expense—2 feet fall elevates water 50 feet, etc. Guaranteed. Catalogue FREE. RIFE RAM CO., 2191 Trinity Building, New York City.

FOR SALE—Complete sets of casting for opposed motors or 4-cylinder vertical, water or air-cooled. Comet Motor Works, 47-49 Canal St., Chicago, Ill.

FOR SALE—Double cylinder, 4-horsepower Gasoline Marine Engine. Make and break ignition. Wm. Larkin, Lake Bay, Wash.

FOR SALE—1 Edison Dynamo, 12 kw. or 200 light machine; 110 V. direct current; good as new; a bargain. E. B. Workman, Woodward, Okla.

FOR SALE—25 h. p. double cylinder vertical stationary two-cycle gasoline engine; very steady power. Low price. Termaat & Monahan Co., Oshkosh, Wis.

FOR SALE—Midget dynamo; ¼ h. p. water motor, and 1/6 h. p. 6 speed French dynamo-motor, all perfect, \$11. Ph. Haver, 21 Bridge St., Paterson, N. J.

MARINE ENGINE, 2 H. P., with all boat fittings, \$29. W. F. Maurer, Fostoria, Ohio.

FOR SALE—Several 4½ h. p. Locomobile Steam Engines, in A1 condition. Price, \$29 each. Also several Locomobile 16-inch copper tube boilers, in A1 condition. Price, \$40 each. R. Roth, 1423 North Ave., Bridgeport, Conn.

FOR SALE—Good 6 h. p. engine, vertical, water cooled, with coil, plug and carbureter. H. E. Burlingame, Providence, R. I.

FOR SALE—Best air cooled motors, ½ to 3 h. p. For any purpose. Horton Model Works, Detroit, Mich.

FOR SALE.

FOR SALE—Two coin-operated Regina music boxes with 48 pieces of music. Very cheap for cash. Address 6102, Popular Mechanics.

DEPENDABLE WATCHES ON CREDIT. Cut prices. Keep jeweler's extra profit yourself and use while paying. No publicity. Satisfaction guaranteed. Booklet free. Berlin Co., Birmingham, Ala.

FOR SALE—Patterns and tools for 2 h. p. stationary gasoline engine; also a lot of castings for same. This is an up-to-date engine, and is well advertised. A good chance for some one who can look after it. Address J. F. Schulz, Box 176, North Chicago, Ill.

GASOLINE Engine Igniter, used one month, \$7. Pither Sharp, Seneca St., Pontiac, Mich.

\$30 EASTMAN film plate camera, 3¼x4½, guaranteed, \$20. Postal note. Harry Roethe, Fennimore, Wis.

FOR SALE—Brass letters and figures to embed in cement walks, curb blocks, etc.; reversed letters and name stamps to make impressions in cement. Send for price list. Knight & Son, Box C, Seneca Falls, N. Y.

FOR SALE—New Induction Coil, 2-inch spark. Address Box 292, Upper Sandusky, Ohio.

FOR SALE—Heavy Toblar running gears; four new 28x3 tires on it. Cash, \$75. Howard Lane, Janesville, O.

A BARGAIN. We have 1,000 14k solid gold fountain pens to dispose of at 75 cents each. These pens are made of polished vulcanized rubber and set with a 14k solid gold pen. For clear writing and even flow of ink they are unsurpassed. They are equal in every respect to the pens which ordinarily sell for \$2.50 and \$3. A written guarantee with each pen. If not pleased, your money will be refunded. Outfit complete, pen and filler, in a neat box, for only 75 cents. H. I. Poor & Co., Box 548, Chicago, Ill.

FOR SALE OR EXCHANGE.

TO EXCHANGE—Factory equipment iron and wood working machinery, no buildings. Must be in good condition, for brick business block in southern Minnesota. Railroad center. Title perfect from owner. Relerson Machinery Company, 184 Morrison Street, Portland, Ore.

STEREOPTICON and 75 slides. C. W. Maupin, St. Paul, Ind.

EDISON MOVING PICTURE outfit for sale or exchange. Cost \$275. Want gasoline runabout. 721 Seneca St., Webster City, Iowa.

DO YOU WANT a 2½ h. p. vertical water tube boiler, with gauge, safety valve and water glass, only been steamed up twice, for \$25? Or what in trade? Carl Barton, Big Rapids, Mich.

TO EXCHANGE—Air cooled motor, 3½x4½. Wilford Depoy, Muncie, Ind.

WILL TRADE for 2-cylinder Orient Buckboard. W. R. Crandall, Mankato, Minn.

EXCEPTIONALLY good '03 Olds runabout for sale, or trade for '06 or '07 Indian motorcycle. Jesse Henderson, Flemingsburg, Ky.

PLUMBERS' SUPPLIES.

COMPLETE LINE up-to-date plumbing and steam goods at wholesale to the public. Get catalogue. John Hardin, quarter century at 4542 Cottage Grove Ave., Chicago.

BLACKSMITHS.

BLACKSMITHING—First lessons; in three chapters, with 47 illustrations. Easy lessons, by a practical blacksmith. Chap. 1, Tools and Materials; Chaps. 2 and 3, Bending, Swaging and Welding. Price, 10 cents, postpaid. Popular Mechanics.

BLACKSMITHS—Young men who wish to become master mechanics and expert tool workers may do so in a very short time by using Toy's Treatise on new steels, explaining how to work them with 75 new methods for working all difficult jobs. Ten receipts for making your own compounds for welding different kinds of steel solid. Thermite welding fully explained; also two colored tool tempering charts; chart A explains all annealing and hardening; chart B explains both scientific and plain tempering to a standard. Neatly arranged in pamphlet form for the small price of \$1. Valuable sample free. W. M. Toy, Sidney, O. P. S.—Get in line for big salaries later; good blacksmiths are scarce.

BRAZE THAT AND SAVE \$\$, Cast Iron, Steel, Copper, Bandsaws, Bronze or Brass with our New Process Compound, 80c per lb. By express, with guarantee. Cummings Compound Co., 364 Avery Ave., Detroit, Mich.

WANTED.

WANTED—Back numbers Popular Mechanics previous to March, 1906. W. W. Billingslea, Macon, Ga.

WANTED—A good invention, patented or unpatented. Box 10003 Popular Mechanics.

WANTED—Patented specialties to handle as selling agents. General Specialty Co., Syracuse, N. Y.

WANTED—8-in. or 9-in. foot-power lathe, in good condition. Address Frank Ross, Martins Ferry, O.

WANTED—Orders for ¾-inch dimension bills, in widths not over 6 inches; oak, pine and poplar; lengths, 6 inches to 3 feet. Pennsboro Lumber Co., Pennsboro, W. Va.

WANTED—Set 28x2½ in. single tube tires; cheap. I. J. Barnard, Westville, Ind.

WANTED—MARINE ENGINE, 2 h. p. Must be cheap. State condition. A. Kakara, Manville, Ill.

WANTED—STEAM ENGINE, ¼ to ½ h. p. Carey Black, 554 Adelaide St., London, Ontario, Canada.

WANTED—Work for small lathe and drill press, or will install special machinery to manufacture some small salable article. Our shop is at your service. Beelman & Byrer Mach. Wks., Chicago, Ohio.

WANTED—Second-hand screw-cutting lathe, about 12-inch swing. Address Box 159, Marshalltown, Iowa.

AGENTS WANTED.

AGENTS make big money selling our new sign letters for office windows, store fronts and glass signs. Easily put on. Write to-day for a free sample and full particulars. Metallic Sign Letter Co., 77 No. Clark St., Chicago.

WANTED—Agents, machinists, toolmakers, draftsmen, attention! New and revised edition Saunders' "Hand Book of Practical Mechanics" now ready. Machinist says, "Can't get along without it." Best in the land. Shop kinks, secrets from notebooks, rules, formulas, most complete reference tables, tough problems figured by simple arithmetic. Valuable information condensed in pocket size. Price, postpaid, \$1.00, cloth; \$1.25, leather with flap. Agents make big profits. Send for list of books. E. H. Saunders, 216 Purchase St., Boston, Mass.

AGENTS—Portraits, 35 cents; frames, 15 cents; sheet pictures, 1 cent; stereoscopes, 25 cents; views, 1 cent. 30 days' credit. Samples and catalog free. Consolidated Portrait Co., 290, 172 W. Adams St., Chicago.

AGENTS' MONEY MAKER—Sell the "Eureka Door-Knob Bell." Entirely new, Bronze Metal. Screw driver only required to replace regular door knob. F. B. Black Co., Kansas City, Mo.

AGENTS wanted to sell our Stylographic and Fountain Pens. Write for Catalogue and Agents' discount. J. L. Ulrich & Co., Mfrs., 27 Thames St., New York, N. Y.

AGENTS—Manufacture your own extract; six improved formulas, 25c silver; 500% profit. Address 112, care Popular Mechanics.

AGENTS CAN MAKE \$10 PER DAY selling our burnished gold and silver letters for office windows, store fronts and glass signs. Anyone can apply these letters by following directions sent with each order. Write for our 8-page illustrated circular. S. H. Parrish & Co., Clark and Adams Sts., Chicago.

AGENTS—Here is easy money for you. Shoes for flat-irons. Sells itself. Goes in every home and laundry. Hot-test seller on the market. Agents are making over \$50.00 weekly. Get busy. Address Dexter Supply Co., 332 Dearborn St., Chicago.

AGENTS to sell our specialties. Send stamp for particulars. Dept. P., J. C. Specialty Co., 12 Dutch St., N. Y.

AGENTS—Our wonderful cork puller, not a screw; everybody needs, because no hard pulling is necessary; fits all bottles; send for circulars; plated samples, 25c. G. Hawley, 154 Leonard St., New York.

AGENTS—\$300 every month selling our wonderful seven-piece Kitchen Set. Send for sworn statement of \$12 daily profit; exclusive territory. Outfit free. P. Thomas Mfg. Co., 162 D St., Dayton, O.

BURGLAR PROOF—Greatest thing of the age; windows locked with 6-inch opening, put on in one minute; send for sample, 15c each. Agents wanted. Cannon Mfg. Co., 1533 Kenmore Ave., Chicago, Ill.

MALE HELP WANTED

BOOKKEEPERS—Bright young men, thoroughly familiar with up-to-date methods, for positions with high grade firms; chances for advancement excellent; salaries, \$700-\$1,200; write to-day; offices in 12 cities. Hapgoods, 305 Broadway, New York, N. Y.

SALESMEN—Are you not willing to make some good side money, without the least possible risk or expense? No sample to carry; start now. Davenport Ice Clipping Machine Co., Davenport, Iowa.

WANTED—High grade salesmen to market Elastikote and Tropical Rubber Paint, together with our complete line of Lubricating Oils. In **uncovered** territory. No technical knowledge required. The Tropical Oil Co., Cleveland, Ohio.

WANTED—Dragline Machine Crew. Apply at once. Ewing, Foley & Gleason, Felton, Minn.

WANTED—Intelligent representative in every machine shop and factory. Increase your weekly income two to five dollars. No soliciting. Tatlock Bros., Rochester, N. Y.

WANTED—Capable agents to handle new high grade up-to-date articles; lightning sellers in all homes, offices, stores, shops; \$3 to \$10 daily guaranteed. Promotion assured. P. Thomas Mfg. Co., 162 D St., Dayton, Ohio.

A HUNDRED FIREMEN AND BRAKEMEN wanted on railroads in Chicago vicinity, to fill vacancies caused by promotions. Experience unnecessary. State age, height, weight. Firemen, \$100 monthly, become Engineers and earn \$200. Brakemen, \$75, becoming Conductors earn \$150. Name position preferred. Railway Association, Room 174, 227 Monroe Street, Brooklyn, N. Y. Employment Headquarters for all railroads.

WANTED—Mechanics to sell our fine line of Calipers and Levels. Good pay. Address E. G. Smith Co., Columbia, Pa.

SALESMEN—Write the Dayton Label Co., Dayton, O., for sample outfit and sell merchants 2,000 advertising stickers for \$1 "on the side;" 40 per cent commission and a square deal. Write now.

GOOD SALESMEN WANTED for a patented specialty selling for \$50 and \$75; needed in all manufacturing plants. May devote entire or part time. Some of our representatives average \$15 a day. Some more. Write at once to Power Specialty Co., 240 Fort St., Detroit, Mich.

SALESMEN WANTED—Must be experienced selling power transmitting, mill and factory supplies. Salary and commission. Give age, experience and reference. L. F. Grammes & Sons, Allentown, Pa.

\$100 PER MONTH SALARY—Paid weekly. Energetic man in each county to represent Hardware Dept. Established business. Expense money in advance. The Columbia House, H-7, Chicago.

EDUCATIONAL AND INSTRUCTION.

STUDY ELECTRICITY AT HOME—A complete electrical course at home, containing 30-page detail book, 220-page text-book, 200 experiments and over 100 pieces of apparatus. Price, complete, only \$5.60. Catalogue "PS" explains this and other remarkable offers. Thomas M. St. John, 848 Ninth Ave., New York.

FOR SALE—Chicago College of Advertising scholarship, value \$40; will sell for \$20. Graduates of this school are making from \$30 to \$75 per week. Address 6103, Popular Mechanics.

ARE YOU MAKING less than \$25 or \$30 per week? Mechanical and Structural Drawing taught by experts. Send for circular. Low tuition, including Free Books, Drawing Instruments, etc. Columbia Correspondence School, Drexel Bldg., Philadelphia, Pa.

MONEY IN NOVELTIES—Our advertisers and readers are looking for good new novelties to put on the market. They have money for the right inventions in utility, amusement and advertising novelties. What have you got that's good? Reach this field through "The Novelty News," 171-5 Washington St., Chicago. Trial 3 months, 25 cents.

In the choice of a life vocation, why not take up **LETTER ENGRAVING**? A clean, interesting and remunerative calling which you may now successfully learn at home. Taught in a thorough yet economic way by the New England School of Engraving, Worcester, Mass.

BOOKS AND PERIODICALS.

FOR SALE—Engineering Library. Ten volumes, bound in ¼ morocco. Covers completely the field of Steam and Electrical Engineering. Is in first-class condition. Cost, new, \$50. Will sell for \$15. Address T. A. Z., Box 425, Chicago, Ill.

FOR SALE—A thorough treatise on Electricity. Covers entirely electricity in all branches. Five volumes. Cost, new, \$19. Used but short time. Are in fine condition. Will sell for \$9. Address T. F. B., Box 425, Chicago, Ill.

IF IT'S PRINTED—MacDonald can supply it—Domestic and Foreign publications of every description—Plays—reading and recitation books—Dramatic Journals supplied by mail. "Catalogue P. M. sent free." Chas. MacDonald, 53 Washington St., Chicago, Ill.

FOR SALE—Cyclopedia of Engineering. Steam, electrical, mechanical. Bound in three-quarters red morocco leather. Five volumes. Cost new \$19. Used but slightly. Are in fine condition. Will sell for \$9. Address J. T. B., Box 425, Chicago, Ill.

GET A GOVERNMENT POSITION—Our book fully instructs how. Failure if studied impossible. Address Frank B. Pergande, Publisher, Whitefish Bay, Milwaukee, Wis.

ELECTRICIAN AND MECHANIC—Practical monthly magazine for electrical and mechanical students and workers. Publishes illustrated directions for constructing dynamos, motors, gasoline engines, wireless telegraphy, electroplating, electrical wiring, mechanical drawing, using tools, furniture construction, photography, all kinds of mechanical work. One dollar yearly; single copy with book catalogue, ten cents. P. M. Sampson Publishing Co., 6 Peacon St., Boston, Mass.

LAND FOR SALE

FOR SALE—Engineering Library of twelve volumes. Steam, electrical, mechanical. Bound in three-quarters red morocco leather. Cost new \$60. Are in excellent condition. Used but short time. Will sell for \$18. Address P. M. R., Box 425, Chicago, Ill.

FOR SALE—"Cyclopedia of Modern Shop Practice." A complete reference work for machinists, foundrymen, etc. Leather binding, four volumes. Cost \$18. Will sell for \$6. Address P. M., Box 425, Chicago, Ill.

FOR SALE—Complete I. C. S. Mechanical Draftsman's course. Address 113, care Popular Mechanics.

"**THE SCHEMER**," ALLIANCE, OHIO, helps its readers coin money by keeping them posted on all new schemes; gives 48 pages of winners every month; year, 50c; 3 sample copies, 10c.

FOR SALE—Four sets reference books, brand new and up-to-date. One five volume Dictionary. One five volume Encyclopedia. One 25 volume set Library of Valuable Knowledge. One 32 volume set Makers of History. A bargain at \$75, delivered; or will sell sets separately. Write for particulars at once. Offer good until Nov. 30 only. Lock Box 171, Walworth, Wis.

COPYRIGHTED BOOK on Mail Order, 20c. Emil Palm-land, 406 Seventh St., Brooklyn, New York.

I WILL SELL set of ten International Correspondence School's Civil Engineering volumes, \$20. One illustrating volume, \$3, and one set of drawing instruments, \$5, all new. Hubert Franz, Medford, Wis.

FOR SALE—Cyclopedia of Architecture. Ten volumes. First class condition. Worth \$60.00. Leaving city, will sell for \$12.00. Address R. O. M., Box 425, Chicago.

THE ENGINEERS' LIST; Monthly. Steam Engineering; Electricity; Refrigeration; Science; Home Study Department. 50 cents yearly; 5 cents sample. Special Editions. Pumps, Refrigeration, Cooling Towers. Twenty-five cents each. 110 W. 34th St., New York.

PICTURES AND POST CARDS.

ONE DOZEN PHOTO POST CARDS made from any photograph for 50 cents. Your photograph returned with order, postpaid. All work guaranteed. Enough said. Give us a trial. Photo Card Co., 395 W. 17th St., Chicago, Ill.

BEAUTIFUL SOUVENIR PICTURE, 12x20, entitled "King of the Forest," and new bargain sale lists of curios. All for 20c, prepaid. George J. Tills, Albion, N. Y.

10 SOUVENIR POSTCARDS GIVEN with a 6 mos. subscription for 25c to largest and oldest 100-page monthly on Coins, Stamps, Postcards, Curios, Minerals, Autographs, Photographs, Relics and Old Books. Organ of the largest Stamp, Curio, Postcards and Camera Clubs. Ads pay—1c per word. Pbl. West and Camera News, Superior, Neb. Sample free. 3 Mos. trial, 10c. It's Nebraska's largest monthly.

PRINTING.

100 BUSINESS OR VISITING CARDS for 35c. Envelopes, 50c per 100, postpaid. W. C. La Clear, Lock Box 40, Gaylord, Mich.

LAUNCH AND STEAMBOAT MACHINERY

SAFE AND SURE, therefore NOT gasoline. Economical and long-lived, therefore STEAM. Nothing complicated or uncertain. Built to order to meet conditions. Catalogue free. Marine Iron Works, N. Halsted Station, Chicago.

CEMENT

IF YOU WANT the best information on cement and concrete construction subscribe for Concrete, leading cement and concrete monthly. Sample copy, 10 cents. Concrete, 135 Newberry Bldg., Detroit, Mich.

PHOTOGRAPHERS' SUPPLIES.

FLASH-LIGHT PHOTOGRAPHY—Keep up with the times. When making photographs at night or during the dark winter weather, use "The Press Electric Flash Lamp" (described in March issue Popular Mechanics). Simple, safe and reliable. It never fails. Used and approved by the best daily paper photographers. So simple a child can operate it, but it never fails. Soon saves its cost in powder. Send for circular. J. E. Hare, 117A Market St., Chicago.

TEXAS FARM LANDS are booming. 160 acres of our North Texas lands at \$30 per acre will double in value in three years. Buy now. Illustrated booklet free. Address Texas Farm Land Co., 277 Dearborn St., Chicago, Ill. Agents wanted.

MISCELLANEOUS.

NU-CELL, a preparation for renewing old dry batteries. Large package, 15c (no stamps). Address 2291, Popular Mechanics, Chicago, Ill.

1,450 REGISTRATIONS of motor vehicles in Nebraska. Name and address of owner, description of machine, mailed on receipt of \$1. Address Secretary of State, Lincoln, Neb.

BOATS AND LAUNCHES—We build them. W. O. Tobias, Sales Agent, Clinton, Mo.

I MAKE drawings and blue prints. D. Tappan, Watervliet, N. Y.

PERISHABLE PAPER, writing paper that crumbles to dust. Ink that disappears in 30 days. Transfer fluid. Engravings, designs, etc., transferred from printed paper to note book or handkerchief. Dry battery renewer. Pencils for writing on glass and 75 others, all for 25 cts. (silver). Box 12, St. Rock's, Quebec, Can.

WIRELESS TELEGRAPHY—Something new. Make your own instruments. Instructions, with blue prints, for making, sending and receiving apparatus sent on receipt of 25 cents (no stamps). Address 7503, care Popular Mechanics.

CIGAR BANDS—Imported direct from Europe; entirely different from American bands; 3,000 kinds, all new, stamped with real gold, beautifully colored. Samples, 10 cents, or 40 cents per 100 (no duplicates), postpaid, including illustrated catalogue on professional plate making. Order quick. National Selling Co., Allentown, Pa.

MACHINIST AND DRAFTSMAN'S TABLE, U. S. standard, steam, gas and water pipe tapping sizes. Five cents in stamps. E. E. Meyer, Allegheny, Pa.

FOOL YOUR FRIENDS with the new joke "Chinese Money." The piece we send you is worth less than 1 cent, but you can have all kinds of fun with it. Postpaid, 10 cents. Address 115, care Popular Mechanics.

500 MODEL AIRSHIPS. Complete set of blue prints and directions for making inexpensive and easily made model airship. This little machine offers a splendid opportunity for studying the fascinating problem of aerial navigation. Of profound interest to the master mechanic as well as the amateur experimenter. P. Ganz, Box 951, Billings, Mont.

WIRELESS RECEIVERS. Much more efficient than coherer system. Set consists of sensitive telephone receiver, dry cell and "Imperial" detector. Price, complete, \$2.50, prepaid. "Imperial" detector, only \$1, prepaid. Very neat, small and portable. Send 2c stamp for particulars. International Wireless Co., Box 519, Lima, Ohio.

MODEL AND EXPERIMENTAL WORK—Tools and dies for sheet metal blanking, forming and bending; manufacturing. Let us estimate. The Krug Mfg. Co., 7 Bleeker St., Jersey City, N. J.

FOUNTAIN PENS, \$1.00. Miniature telephones, 10 cents. Miniature alarm clocks, 10 cents. J. G. Specialty Co., Dept. P., 12 Dutch St., New York, N. Y.

GREAT BUSINESS OPPORTUNITY—Everybody wants to wear our pure Aluminum "Comfort" Sanitary Hose Supporters. Just patented. Hold up socks, sleeves, and drawers. Not affected by wear or perspiration. Lock to garment. Never slip on fat or slim. Does away with all harness, buckles, straps, cords and elastic. Regular price 25 cents. Sample pair prepaid 18 cents, or two pairs for 35 cents. Agents wanted everywhere. Thos. H. Devero Manufacturing Co., Monon Block, Chicago.

SPECIAL AND AUTOMATIC MACHINES designed and built. Mechanical drawings and patternwork. Albert Pott, M. E., 23 Platt St., New York; 63 Bank St., Waterbury, Conn.

ARTIFICIAL GOLD that will stand the acid test. Formula only 25c. Address No. 114, care Popular Mechanics.

MECHANICAL JOKE never fails to be understood by any mechanic. Is called "Chinese Money." The piece we send you is worth less than 1 cent but makes dollars worth of sport. Postpaid, 10 cents. Address 115, care Popular Mechanics.

ATTENTION—A pickle that will soften the hardest malleable and cast iron; also for removing rust; investigate. E. J. Scaber, 713 Armitage Ave., Chicago.

MODEL STEAM ENGINE—Send 20 cents (not stamps) for blue prints and directions for making 2-cylinder engine. No machine work required. Address 6105, Popular Mechanics.

WOULD YOU BUILD yourself a foot-power screw-cutting lathe if you had working drawings. Write for information. W. E. Morey, 2563 Frink St., Chicago.

SLIDE RULE REFERENCE TABLES and Formulas complete, 25c silver. A. J. Matter, 518 Commonwealth Bldg., Portland, Ore.

MODELS made for inventors; low prices. Howard Merryman, Towson, Maryland.

MACHINERY, dies, tools, models, novelties and specialties—we make anything and make it right—try us and see. Thirty years' experience; 500 round and square dies 14. in. to 1/4 in. at a bargain. Auto Machine Works Co., 214-216 S. Clinton St., Chicago.

RECIPE—Piano and furniture polish; will not gum; guaranteed; 20 cents. W. C. Hart, Garwood, N. J.

DON'T SLAVE FOR OTHERS. Reap the benefits for yourself. Fortunes made operating automatic penny weighing machines. Our scale speaks your weight. Write for Talking Scale circular. The United Vending Machine Co., 629 Caxton Bldg., Cleveland, O.

TEST BORINGS for foundations, etc.; artesian wells, driven wells, pumping apparatus. J. E. Feeley & Co., 43 S. Market St., Boston. Send for estimates.

TO CHARGE storing batteries from an alternating current, use a Ruprecht Corrector. No moving parts. Durable and inexpensive to operate and maintain. Any cycle. Any voltage. Prices and information for the asking. Ruprecht Electric Co., 7117 Cedar, Cleveland, O.

PERFECTED—10-12 H. P. 60-lb. double cylinder gasoline engines for cycle, boat, carriage. High pressure, belt-driven compressors for tire inflation. Model making, inventions perfected, general machine work. Perfect working drawings from rough sketches. Correspondence solicited. Transactions strictly confidential. The Edben Engine Co., 901 Broadway, Denver, Colo.

TOO LATE TO CLASSIFY

GET YOUR GAS AND ELECTRIC FIXTURES at wholesale prices, and save big money. Put them up yourself and save more money—it's easy. Or get your local gas fitter or electrician to put them up for you, and still save good money. Write for our catalogue sheets and see. State whether you want gas only, or combination gas and electric fixtures. Western Chandeller Co., Mail Order Department, 19 West Lake St., Chicago.

MAKE YOUR OWN patent office drawings. Send 30c for book telling how. A. J. Matter, 518 Commonwealth Bldg., Portland, Ore.

LEARN THE HOT WATER HEATING BUSINESS AND WORK FOR YOURSELF—I teach you absolutely free of charge and enable you to make a good income while learning. Men handy with tools make big money. No expense. For full information write 10008, care Popular Mechanics.

ETCHING ENGRAVING ON GLASS or steel, complete instructions, 25c silver, each; both for 40c. Make big money. A. Relling, 80 Virginia Ave., Battle Creek, Mich.

FOR SALE—A. S. C. Reference Library; twelve volumes; good as new; cost \$60. I need the money, will sell for \$16. Address 117, care Popular Mechanics, Chicago, Ill.

WONDER RAT AND MOUSE exterminator. Why permit rodents to spread destruction and disease when a few cents will rid the place of them? Only 35c postpaid. E. C. Hansbarger, Box 115, Anthony, Kansas.

DESIGNING, DRAFTING and blue prints made from sketch or model; strength of material carefully considered in all designs. Aden Benner, So. Whitley, Ind.

\$3,000 TO \$10,000 YEARLY easily made in real estate business; no capital required; we will teach you the business by mail, appoint you special representative of leading real estate company, list with you readily salable properties, co-operate with and assist you to permanent success; valuable book free. Address The Cross Company, 723 Reaper Block, Chicago. See display ad of this firm on page 1270.

WANTED—CASTINGS, ETC.—Blue print for one or one and one-half motorcycle engine. Address 116, care Popular Mechanics.

FOR SALE—MINIATURE automatic steam power plants, engine, boiler, feed pump and all accessories ready to run, \$10.50; these outfits are operated by high pressure automatic flash boilers, and give more power for weight and size than any other kind of plant; boiler will steam in two minutes; require no attention after starting and will automatically maintain any desired pressure. Price complete, \$5.00. Engines are as well built as the largest and will give same results for size. These are not models or toys, but practical machines at their size, and will develop about 1-16 H. P. on medium pressure. Marine or horizontal engine complete, \$5.00; casting for either engine, \$1.00; blue print, 25c; screw propellers, 25c. O. N. Hansen, 183 DuBoise Ave., Elgin, Ill.

SEND 20c for set of pants and skirts series; 15c for set of Teddy bear postcards or 25c for both, to introduce them. Peerless Trick and Novelty Co., 3148 State St., Chicago, Ill.

STUDY MATHEMATICS and mechanics by correspondence; obtain a college education in these subjects; eleven complete courses; any course (100 lessons) \$15; write for particulars. Ralston Jeffery, Box 19, Huron, Ohio.

PATENTS—H. W. T. Jenner, patent attorney and mechanical expert, 608 F Street, Washington, D. C.; established 1883. I make free examination and report if patent can be had and exactly how much it will cost. Send for circular.

PROGRESS ON PANAMA CANAL IN AUGUST.—The progress of excavation on the Panama Canal during August surpassed that of any previous month, exceeding the July record by 215,625 yd. This was in the face of a rainfall of 11.89 in. The total amount of material to be excavated was estimated in June, 1904, to be 111,280,000 cu. yd. Since then, up to August 31, an aggregate of 10,863,684 yd. has been excavated, completing thereby one-tenth of the canal excavation. This, of course, is not counting the excavating at points adjacent to the canal prism, which cannot be properly deducted from the estimated grand total. On September 1 there were 63 steam shovels at work and 34 more delivered to be placed in commission as soon as possible.

RIVERS OF THE SEA.—Perhaps one of the greatest mysteries of the deep is its currents. Streams that start from no accountable reason and end as abruptly. Some composed of warm water, bringing life and warmth to the shores that they lave; others, cold streams, flowing down past shores which they make barren and inhospitable by their contact.

There is, for instance, the equatorial current that flows into the Caribbean Sea; the overflowing current to the eastward around Cape Horn; the cold stream flowing from the icy regions of the north past Newfoundland and Nova Scotia and along the American coast to the extreme end of Florida; the continual current running with a velocity of from four to five knots an hour through the Straits of Gibraltar into the Mediterranean Sea; the swift current running across the rocks and shoals of the end of Billiton Island, which apparently starts from nowhere and ends somewhere in the vicinity of the same place, and the current which starting half way up the China Sea runs from two to three knots an hour to the north, and finally ends abruptly at the north end of Lubon.

Rivers of the sea, these, whose source, origin and maintenance must ever remain a mystery, and yet obeying the law that creates them as faithfully as do the rivers of the land, and serving their purpose in preventing the waters of the sea from becoming stagnant.



FREE

This \$13.85 DRAWING OUTFIT

See offer, page 1287 of
Successful Draftsmen

Do You Wear Glasses?

Does Your Wife, Mother, Sister?

Perhaps you know, then, how irritating it is to find that the little screws have become loose, also how very often this happens. Here are

several little tools for quickly and effectively attending to such cases, made especially for that purpose:



No. 556 Screw Driver for Eye Glasses is made in two pieces and screwed together, telescoping the blade when not in use. Nickel plated. Price, 15 cents.

No. 558 is threaded on the end opposite the blade. This may be reversed and screwed into the part with the ring, thereby making a longer handle. Nickel plated. Price, 20 cents.



No. 554 is made with a chuck to hold the blade firmly in a split socket when in use. The blade is removed by slightly loosening the chuck, then reversed and inserted into the socket nearly full length and held safely by tightening the chuck. Nickel plated. Price, 25 cents.



Carry one in your pocket, on your key-ring or watch chain. Either style mailed on receipt of price.

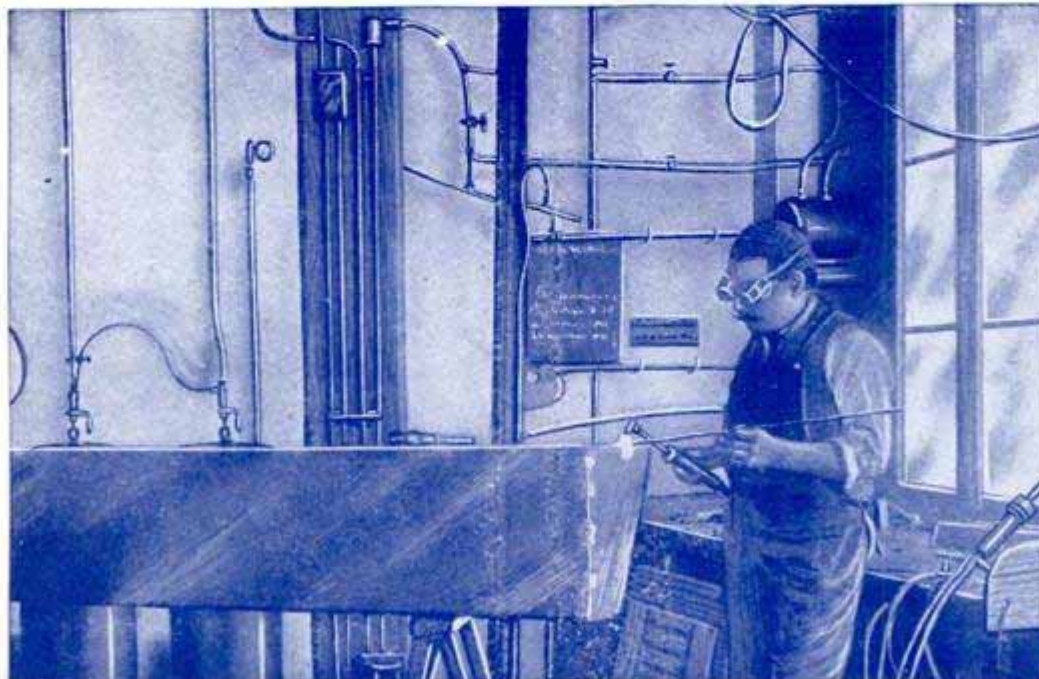
Ask for complete Catalog No. 17AP of Fine Tools

THE L. S. STARRETT CO.

ATHOL, MASSACHUSETTS, U. S. A.

AUTOGENOUS WELDING EPURITE PROCESS

(PATENTED)



EASY

EFFECTIVE

ECONOMICAL

INDUSTRIAL OXYGEN CO., Hanover Bank Building, New York

Power Problems

with power users are all of the direct kind.

Is it reliable?

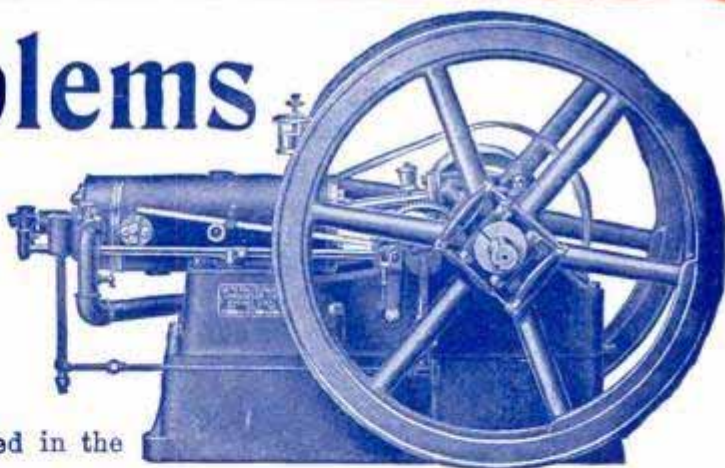
Can anybody run it?

Is the running cost low?

Is it safe?

Is it adapted to your purposes?

These questions are all satisfactorily answered in the



I. H. C. Gasoline Engines

They are built on correct mechanical principles and only the highest grade material and thoroughly skilled workmanship are used in their making.

They can be depended upon to respond promptly, with abundant power, whenever call is made on them. A combination of efficiency, dependableness and durability that is found in engines of no other make.

Made in the following sizes:

VERTICAL, 2 and 3-H. P.

HORIZONTAL, (Stationary and Portable) 4, 6, 8, 10, 12, 15 and 20-H. P.

Call on the local International agent or write the office for catalog.

International Harvester Company of America, 70 Monroe St., Chicago, U. S. A.

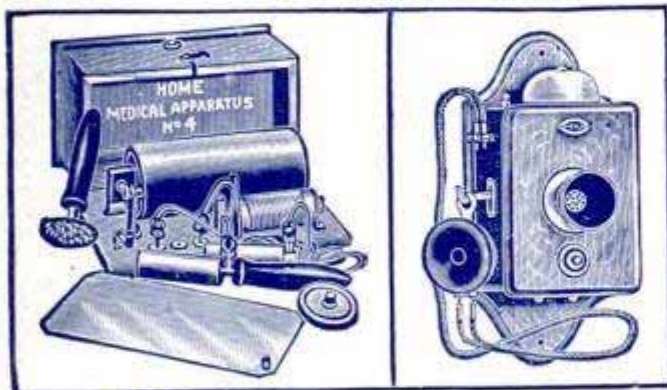
(Incorporated)



Save 20% on ELECTRICAL GOODS

You may buy "Mesco Quality" Electrical Supplies from your local dealer or direct from the manufacturers' complete stock, and figure on saving about 20% on initial cost or renewal. We can make the prices because we make the goods.

"Something Electrical for Everybody."
Ask for Catalog No. 22 P. N.



Compare these prices, taken from Catalog No. 22 P. N.

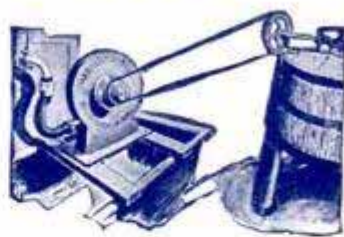
Home Medical Apparatus—complete (see cut),	\$ 3.50
"500 feet line" Battery Telephone (see cut)	2.50
"Mesco" Dry Battery, 2½ x 6 (bells, phones, etc.)	.15
"Red Seal" Dry Battery, 2½ x 6 (for ignition work)	.25
Battery Motor (runs on 1 dry cell) Post pd.	.50
Learner's Telegraphic Outfit with Instructions	1.25
Elite Battery Ammeter, reg's up to 30 Amperes	2.00
Mesco Jump Spark Coil (ask for circular)	4.50
Battery Decorative Miniature Lamp Outfits	5.00
Morison Electric Vibrator (ask for circular)	15.00

Mention Popular Mechanics. Address nearest house

Manhattan Electrical Supply Co.
17 Park Pl., New York 188 Fifth Ave., Chicago
Largest Exclusive Mfrs. of Electrical Supplies in U.S.



WATER POWER



FOR DOMESTIC AND GENERAL USE

We have just issued a very attractive and interesting little booklet showing and illustrating 15 different ways in which you can harness the water from your household faucet to perform most useful and trouble-saving tasks. This booklet also catalogues and illustrates our splendid line of larger water motors (¼-10 H. P.) and water fans, and tells about this interesting force which every one has already at hand. This will interest you. The booklet is free and we shall be pleased to mail a copy to any address. If interested just write us, "Send Water Motor Booklet."

WARNER MOTOR CO.

Dept. 14, Flatiron Building
NEW YORK CITY

Utica Giant Button's Plier

The strongest, the handiest, the most powerful and the easiest cutting tool of its kind.

Can be used as a pipe grip, a flat-nose plier, and a wire cutter. It has four wire cutters, two of which are so designed that the wire is held between the jaws after cutting.

A Handy Plier That Everyone Should Have

TOOLS OF QUALITY ARE STAMPED



Only the genuine bear this mark. It's a guarantee of quality

Write for Plier Palmistry and Catalog

UTICA DROP FORGE & TOOL CO.

73 Genesee Street, :: UTICA, N. Y.

HOW TO RUN AN AUTO

Are you Interested in Automobiles?

If you are, an early purchase of the 1907 edition of "HOMAN'S SELF PROPELLED VEHICLES" will prove a good investment.

This work is now the accepted standard on the practical care and management of motor cars—explaining the principals of construction and operation in a clear and helpful way, and fully illustrated with many diagrams and drawings.

The presentation of subjects has been determined by consideration of the needs of the man behind the wheel. It is clear and concise in its treatment, and comprehensible to the most inexperienced automobilist, at the same time it is so thorough that the expert will learn much from its pages.

This good book will be sent to any address in the world, postpaid, upon receipt of two dollars, or if desired, will be sent on approval to be paid for after examination.



Contains 608 pages, over 400 diagrams and illustrations, printed on fine paper, size 5½ x 8½ inches, with generally good binding. Highly endorsed.

No money in advance required, sign and return
J. H. AUDEL & CO., 613 Fifth Ave., New York
Kindly mail no copy of "Homan's Auto" and if found satisfactory I will immediately remit for return book to you

NAME.....
ADDRESS.....
CITY.....
STATE.....
DATE.....